Charting a trail in the dark: searching for evidence in the public interest design process.

by

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A REPORT

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Department of Landscape Architecture and Regional & Community Planning
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Abstract

The City of Manhattan, Kansas ("the City") is planning a landscape improvement project for a 0.3-mile portion of one of its non-vehicular rights-of-way ("the Trail"). The focus of the City's project is to resolve safety issues that have arisen due to a lack of nighttime lighting. While the City's plan is to implement lighting, this plan would not comprehensively address the Trail users' and stakeholders' needs. This study asks, "What design alternatives can be generated to address lighting, safety, and other user and stakeholder concerns for the Trail?"

This study employs a literature review, a site inventory and analysis, and a pair of surveys to facilitate the synthesis of a series of design alternatives. The literature review analyzes urban design theory and environmental psychology research to develop a series of design considerations. The site inventory and analysis documents the Trail's existing conditions through photography, drafting, inventory, observation, and dérive. User and stakeholder surveys were also conducted to gauge existing usage patterns and perceptions of the Trail. From the findings of these methods, a series of environmental designs were developed which respond to users' experience and stakeholders' needs as they use and consider the Trail. These designs range on a spectrum of intervention from "minimal" to "high."

It was determined that there are two key regions of the Trail which need immediate attention: an area of thick overgrowth ("the Tunnel") and an area of ponding and erosion ("the Low Water Crossing"). Additional design considerations were also revealed and addressed by the design alternatives. These designs where then presented to a group of stakeholders who determined that rather than implementing one intervention level, a phasing strategy to implement

all intervention levels would be of particular interest. This study also reveals the potential need for a future study about the Trail which would allow stakeholders to analyze the effects of specific, constructed design interventions.

CHARTING A TRAIL IN THE DARK

SEARCHING FOR EVIDENCE IN THE PUBLIC INTEREST DESIGN PROCESS

NEAL HEIDT | MASTER'S PROJECT + REPORT | LANDSCAPE ARCHITECTURE | KANSAS STATE UNIVERSITY

Charting a Trail in the Dark: Searching for Evidence in the Public Interest Design Process

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ABSTRACT

The City of Manhattan, Kansas ("the City") is planning a landscape improvement project for a 0.3-mile portion of one of its non-vehicular rights-of-way ("the Trail"). The focus of the City's project is to resolve safety issues that have arisen due to a lack of nighttime lighting. While the City's plan is to implement lighting, this plan would not comprehensively address the Trail users' and stakeholders' needs. This study asks, "What design alternatives can be generated to address lighting, safety, and other user and stakeholder concerns for the Trail?"

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LIST OF ABBREVIATIONS

ADA
Americans with Disabilities Act

ART
Attention Restoration Theory

ATA
Flint Hills Area Transportation Agency

BLM
Bureau of Land Management

CAD
computer-aided drafting

DEM
digital elevation model

FC
foot-candle(s)

FoSFT
Friends of Santa Fe Trail (Dallas)

GIS
Geographic Information Systems

HDS
Housing and Dining Services (KSU)

HT
Habitat Theory

IDA
International Dark-Sky Association

IRB
Institutional Review Board (KSU)

ISO
International Standards Organization (photography)

JD
Juris Doctor

KSAC
Kansas State Agricultural College

KSHS
Kansas Historical Society

KSU
Kansas State University

LARCP
Department of Landscape Architecture and Regional & Community Planning

LED
light-emitting diode

MHK
City of Manhattan

NARA
National Archives and Records Administration

NCAA
National Collegiate Athletic Association

NPR
National Public Radio

NPS
National Park Service

NTE
nighttime economy

OPEC
Organization of the Petroleum Exporting Countries

PA
Bureau of Public Affairs

PDF
Portable Document Format

PhD
Doctor of Philosophy

PLA
professional landscape architect

POE
Post-occupancy evaluation

PRT
Prospect Refuge Theory

PUD
planned unit development

PV
photovoltaic

SRT
Stress Recovery Theory

STA
station point

SCP
situational crime prevention

SDOT
Seattle Department of Transportation

TOD
transportation-oriented development

Tr
trail

UMC
United Methodist Church

URL
uniform resource locator (world wide web)

USDA
United States Department of Agriculture

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The dozen or so people who prayed for this study to be fulfilled and for it to have an impact on the Trail community

Anyone who carries improvement projects along the Trail forward through academia or implementation

DEDICATION

I would like to dedicate this book to Jesus. Throughout the last 16+ months, He has given me what it takes to overcome apathy, depression, and fear, and led me to discover a few new passions along the way. Anything that is worthwhile in this book is not something I can take credit for.

PREFACE

Dear reader,

If you have come to this page, this book was written for you. Between my work and that of those listed on the acknowledgments page, this book has been several years in the making, and I am overjoyed to share what we have learned with you.

As I was writing this book, I realized two things: (1) there are several dozen groups of people who have personal ties to this trail, and (2) this greater community is largely unaware of itself. In other words, the "community" has yet to discover its "unity." My goal with this book is to begin bringing together a diversity of people groups around a common interest many of them may not realize they have: landscape architecture.

The following page describes the intended uses for this book, specific to the audiences it is written for. My hope is that through the research, findings, and appendices in this book, you might begin see the opportunities you have to significantly impact the lives of hundreds of people through your potential involvement in this trail.

Yours truly,

Neal :)

"The presence of good [architecture] will unconsciously refine a community... and poor [architecture] will do it incalculable harm."

— Robert Henri, *The Art Spirit*, p. 115

HOW TO GET THE MOST OUT OF THIS BOOK

ACADEMIA

This book is graduate-level research which was conducted within the Department of Landscape Architecture and Regional & Community Planning. The study was conducted with the mindset that this would be research conducted to help inform design decisions along the Trail. It was initially suggested by an employee of the City that a follow-up study also be conducted which documents the Trail's changes in physical form, usage patterns, and public perceptions (see: Chmiel 2016).

I recommend that anyone conducting a follow-up study refer to the following features of this book, which are intended to benefit their research:

- The methodology used in this study, as a potential methodology framework
- The List of Abbreviations and Glossary, to inform the future study's language
- The Photodocumentation appendix, which documents the site's appearance in early 2017

Additionally, any student conducting a study on a similar topic is encouraged to refer to the Methodology chapter and methods appendices for examples of procedural setups and IRB applications.

CITY AND UNIVERSITY ADVISORS, ENGINEERS, AND PLANNERS

This study was conducted with the intent that as the City moves forward with City/University funding for interventions along the Trail, it might do so in such a way that design satisfies the user's environmental needs in a holistic way. Frequent correspondence with City employees, City advisory board members, a University campus planner, other University stakeholders, private stakeholders, and an advisory committee of professors has shaped this academic project into what you see here.

You will notice that the texture of the pages and the size of the margins on each page have been intentionally designed to allow you to annotate the text as you wish. As you begin to brainstorm your own interventions to the site, please use this book not as a how-to manual, but as a workbook you can jot out ideas, sketch in, and develop your own approach to Trail interventions.

The following features of this book may be of particular interest to you:

- The literature review
- The precedents given in the Literature Review chapter
- The Findings and Conclusions chapters
- The Design Alternatives chapter

LANDLORDS AND LAND OWNERS

This research has been made readily available to you so that you might consider the current, near-future, and distant-future implications this trail might have for the Campus Acres neighborhood and the Collegiate Villa and Jardine complexes.

As you consider the opportunities you have to benefit from by capitalizing upon this trail, the following features of this book may be of particular interest to you:

- The resident habits and interests described in the Findings chapter
- The Conclusions chapter, which provides action steps for interested parties
- The Glossary, which defines and clarifies the language used in this book in an easy-to-understand way

THE PUBLIC

This book is an academic study, written with you in mind. You are the users, tenants, and potential philanthropists and volunteers that are the makeup of this trail.

As such, the language with which this book is written is intended to be easy to understand by the masses. Any industry-related terms clarified in the book's glossary.

The following features of this book may also be of interest to you:

- The Introduction & Background chapter, which describes the trail's conditions and dilemmas, and Site History appendix, which describes how the trail has evolved over time
- The Findings chapter, which reveals the key takeaways of this study
- The recommended phasing given in the Design Alternatives chapter, as well as the Conclusions chapter, which provide several ways in which you can contribute to making the trail a better place for all to use

CHARTING A TRAIL IN THE DARK:

SEARCHING FOR EVIDENCE IN THE PUBLIC INTEREST DESIGN PROCESS

APDESIGN

LANDSCAPE ARCHITECTURE AND
REGIONAL & COMMUNITY PLANNING

THE COLLEGE of
ARCHITECTURE, PLANNING & DESIGN // K-STATE

I

INTRODUCTION & BACKGROUND

STUDY OVERVIEW | EXISTING CONDITIONS & SCOPE

I. INTRODUCTION & BACKGROUND

"I know personally and anecdotally that the trail is not used much at night because it is perceived as unsafe due to the visibility issue."

— Employee, City of Manhattan

STUDY OVERVIEW

In May 2016, the City of Manhattan, Kansas ("the City") received funding to implement lighting along a 0.3-mile trail (Chmiel 2016) which connects a residential neighborhood with the Kansas State University ("the University") campus. The trail environment does not currently have lighting along it, and several areas with heavy vegetation block much of the ambient light from neighborhood streetlights and stadium lights from reaching the trail. This study examines usage patterns and public perceptions of this trail environment ("the Trail"). It proposes a series of design solutions which attempt holistically meet the environmental needs of the users and stakeholders rather than simply responding to these needs by adding lighting. By addressing the existing Trail, and it provides a framework for understanding human experience of the designed environment which can be replicated by future researchers on the same site once construction is complete.

The research question is this: What design alternatives can be generated to address lighting, safety, and other user and stakeholder concerns for the Trail? In addition to a standard literature review, this study used two methods to reveal evidence upon which to design from: a site inventory and analysis and a pair of surveys. The results of these methods are documented in this report and synthesized into a series of design alternatives which have been presented to stakeholders, including the City, for brainstorming purposes.

EXISTING CONDITIONS & SCOPE

The Trail, as defined by this study, connects Dickens Avenue, where it terminates at College Avenue, to Jardine Drive at its intersection with Hillcrest Drive (Figure 1.01). The Trail connects to several larger right-of-way systems which run along the surrounding streets (see the Additional GIS Data appendix for more details). To the south of the Trail's westernmost access point is a privately-owned multifamily development, and to the north of the Trail's easternmost access point is a multifamily development owned and operated by the University. To the south of the trail is Campus Acres, a single-family neighborhood. Two drainage basins exist beside the Trail, one to the southwest and one to the northeast. The physical trail (the

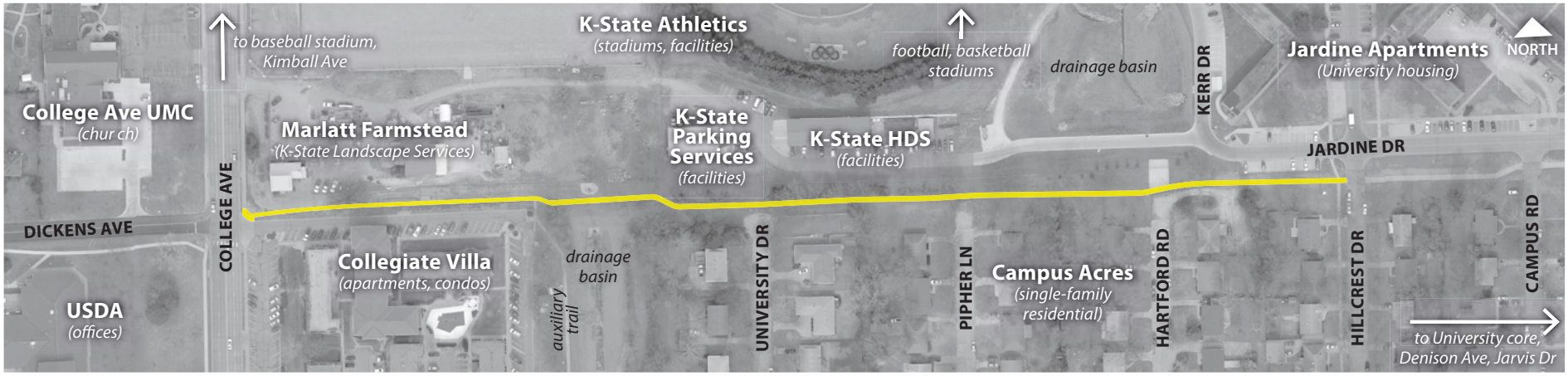


Figure 1.01 The Trail and its immediate context; path outline is superimposed in yellow (adapted from Guarneri 2017)

route itself, otherwise known as "the trail") has six access points: a crossing at College Avenue; a fork which branches southward near the southwest drainage basin; "local street" termini on University Drive, Pipher Lane, and Hartford Road; and a four-way "local street" stop at the intersection of Jardine Drive and Hillcrest Drive. This study examines all right-of-way property along this corridor.

As of the publication of this study, the City has allocated a predetermined amount (roughly $100,000) for the lighting improvements (Hays 2017). Its intent is to use this money to either (1) light the entire length of the trail corridor, or (2) light the "darkest portion" of the trail corridor, the segments of the trail located between Pipher and the fork. Construction of this project is scheduled for sometime after April 2017 (Chmiel 2016; Chmiel 2017).

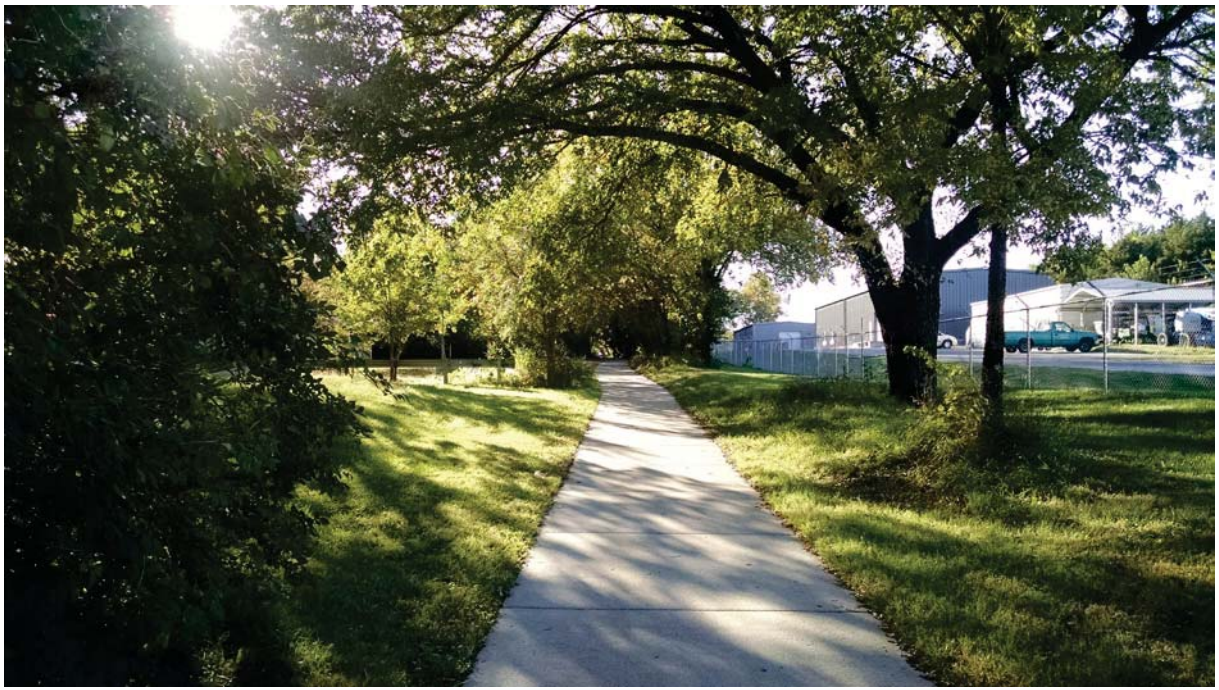


Figure 1.02 Typical environment found along trail. This photo was taken at the intersection of Pipher Lane and the Trail, facing west

Figure 1.03 Dusk along the westernmost portion of the Trail; the westernmost access point can be seen on the horizon; Collegiate Villa can be seen to the left of the Trail; the historic Marlatt farmstead can be seen to the right of the Trail

Figure 1.04 Easternmost access point of the Trail at night; ambient lights from nearby streets light much of the eastern half of the trail

Figure 1.05 A cow path merges with the Trail near the easternmost access point; a private drive connecting to Hartford can be seen at right; shadows prevent some of the light from nearby streets from infiltrating the Trail

Figure 1.06 Photo of the "darkest portion" of the Trail taken using flash; the light bulb at right was a book lamp temporarily installed during the intercept survey; the white lights above the center of the photo are vehicular headlights on Dickens, seen beyond the trees; this photo was taken near Station Point (STA) 07+00, facing west (see the Methodology chapter and the Glossary for further details on station points and surveys)

II

LITERATURE REVIEW

INTRODUCTION | IMAGE MAKING | MEETING CIRCULATION-SPECIFIC NEEDS THROUGH DESIGN | TAKING NIGHT INTO ACCOUNT | SYNTHESIS OF THE LITERATURE | PRECEDENT ANALYSIS

II. LITERATURE REVIEW

"If we are to obtain an overall view of landscape and our experience of it, some kind of rapprochement between the arts and the sciences is essential."

— Jay Appleton, *The Experience of Landscape*, p. 3

INTRODUCTION

Design exists to solve problems. In architecture, design which satisfies and surpasses the needs of the user makes a space attractive to other potential users (Jerke, Porter, and Lassar 2008, 7, 20). How can an understanding of the needs of the user be developed? The simple answer to this question is to understand that the human user shares the same basic needs as all other humans, namely physiological homeostasis, safety, and sociological well-being (Maslow 1943; see the Glossary and Annotated Bibliography appendix for more complete explanations of these terms). This literature review establishes a working knowledge, tailored to this study, of the design considerations which must be made to fulfill the human needs of the user based on the influence of his or her environment. It draws from urban design theory and prior research in environmental psychology to provide a multifaceted approach to understanding how the user's needs are and can be fulfilled through design. It also uses sources which focus on experiential design and its influence on nighttime use (the relationship between which is depicted in Figure 2.02). Precedents which apply these ideas to urban corridors are then examined. This provides the study with a palette of previous successes and failures in employing the concepts of the literature review. The synthesis of the literature and precedent analyses informs the subsequent methods and design process.

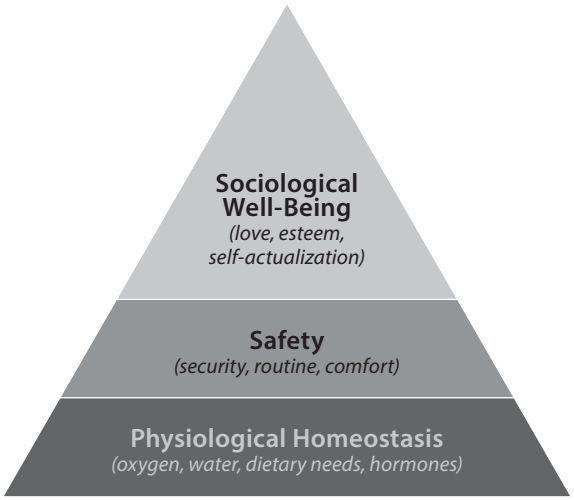


Figure 2.01 Maslow's hierarchy of human needs, adapted for the purposes of this study; each item in the pyramid takes precedence in the human mind over the item(s) above it (based on Maslow 1943)

IMAGE MAKING

Image making can draw potential users into an urban corridor or push them away. The premise of image making is the idea that every user of an environment forms conscious and subconscious constructs about what that environment means to them. Kevin Lynch's *The Image of the City* analyzes the ways those who traveled through urban environments "interpreted" their surroundings. In his study, he found that users of the urban realm were constantly absorbing the environments around them, analyzing them, and synthesizing impressions in their minds of what the place meant to them (1960, 14-16).

If interpretations are naturally synthesized responses of a person to his or her environment, an understanding of image can be a powerful asset to

placemaking in urban corridors. Does the corridor leave a lasting impression on the user? Is the image developed by the user a positive one? Landmarks with tasteful aesthetics and transparency tend to make the user feel comfortable, increasing their feeling of safety within a given space (Ewing and Bartholomew 2013, 10-11, 15, 68-72). Successful image making tools also include the use of vegetation, water, and other natural features in a designed environment. Thirty-one unique studies conducted since *The Image of the City* have revealed that these elements reduce stress, improve behavior, and increase social interaction (Velarde, Fry, and Tveit 2007). An additional study shows that when traveling about an urban environment, users will select a more indirect route if that route provides appeals other than efficiency. Some examples of these appeals include aesthetics, security measures (Dill and Gliebe 2008) and wayfinding systems (Ewing and Bartholomew 2013, 17). If nature-like features, aesthetic beauty, and functional measures are implemented into urban corridors, these corridors can become places of high stature in the public eye because they satisfy user needs.

MEETING CIRCULATION-SPECIFIC NEEDS THROUGH DESIGN

How can design satisfy the specific needs of specific users in an urban corridor? To understand what a given user's needs are, one must examine what he or she knows about that user. Because corridors are typically designed to provide a connection between origin and destination, the user of a corridor is intended to be circulated through it. Therefore, each user possesses a mode of transportation. This could be a car, a bicycle, his or her feet, or another means for circulation. These claims are true of any user, regardless of demographic, usage type, or other person-specific factors. Some amount of sensory "cues," as Lynch calls them (1960, 3) also exist in a corridor, whether these stimuli are intentionally placed there or not. In order to keep a user interested in and functioning well in his or her environment, the appropriate amount of sensory cues must also be utilized (Lynch 1960, 3; Forsyth and Krizek 2011). Different modes of transportation require different design responses, and a designer must be mindful of this. For example, bicyclists' tolerance for sensory cues is extremely low compared to that of pedestrians. This is because they are responsible

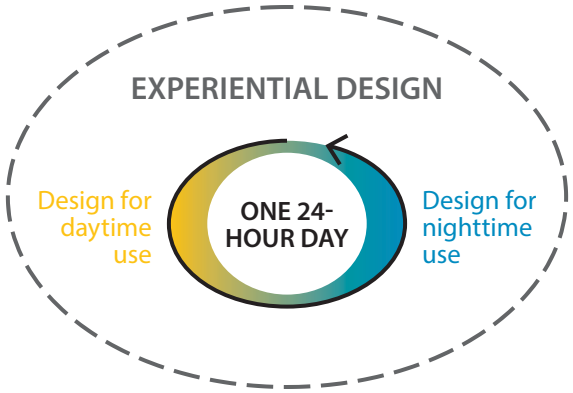


Figure 2.02 The relationship between experiential design and design for nighttime use

Figure 2.03 Narrow paths may limit users from passing those passing in the opposite direction

for keeping themselves and those around them safe, while traveling at higher speeds than pedestrians and therefore with a relatively limited amount of time to process information and react. With this example, appropriate design solution to this dilemma might include simplifying the existing wayfinding system or and widening a sidewalk in order to encourage safety (Forsyth and Krizek 2011) and comfort (Ewing and Bartholomew 2013, 12-14, 38) for bicyclists and simultaneous users.

The higher the quality of the designed environment, the greater its ability to fulfill needs. For bicyclists, a corridor which feels safe, increases efficiency, provides secure storage systems, and allows for multiple modes to be used in a single (commute-scale) route can heavily increase the corridor's use (Dill and Gliebe 2008; Forsyth and Krizek 2011). The ability of one to continue about their actions comfortably without disruption is a subconscious form of security (Maslow 1943) within users as they move about their environments (similar to Jay Appleton's "Habitat Theory," which is described in the Glossary; see also the definitions of "safety" and "security"). For pedestrians, the appeal to use a corridor tends to not only be in the efficiency and amenities provided, but in the cohesion of, amount of variety of, and types of programming along their route. While the primary program of a corridor is circulation, lining it with dining experiences, art, water features, pavilions, and other opportunities to interact with the environment and other users can draw potential users into the corridor (Ewing and Bartholomew 2013, 73-77, 90-106). These things not only provide food, drink, visual appeal, and shelter from natural forces like weather (physiological needs); they encourage the user of the space to feel like circulation is less of a "chore," and more of an "adventure" (Jerke, Porter, and Lassar 2008, 145-146).

However, an understanding of the users' needs in a corridor is not complete if only bicyclists' and pedestrians' needs are assessed. While these two modes may be the most common, others are emerging. Skateboarders, for example, have a unique set of needs just like any other mode of transportation. Some of a stakeboarder's needs overlap with bicyclist's or a pedestrian's, while some do not (Fang 2016, 116-117). In order to design a corridor environment which satisfies the needs of every user, all utilized modes of transportation must be taken into account.

TAKING NIGHT INTO ACCOUNT

Nighttime economy (NTE), or the utilization of night to conduct business, has become a cultural staple around the world over the last century. With its emergence came anxiety, discomfort, unease, apprehension, and panic stemming from an overall fear of crime at night. The dogmatic response to this fear tends to be to employ situational crime prevention (SCP) measures, like policing for example. However, not all SCP measures produce positive images. One study showed that out of six SCP measures, lighting was the only one which produced a consistently positive result (Brands, Schwanen, and van Aalst 2015).

This indicates that lighting may be integral to nighttime experiential design, as it is widely-believed to stimulate greater security within users at night. Another study suggests that a user's image of safety in regards to a lighting design in an urban corridor depends more on the way the lighting makes him or her feel than on the design quality of the landscape it exists within (Viliūnas et al. 2014). In *The Landscape Lighting Book*, Janet Lennox Moyer states that the way in which the designer manipulates lighting styles, fixtures, placement, spacing, and brightness help determine the user's perception of a space (2013, 13-17). For public spaces such as the Trail, a consistent presence of 1 to 2 foot-candles throughout a space is an appropriate amount of lighting to facilitate security (2013, 205-206). The power source and longevity for any implemented lighting system must also be considered in the design process (2013, 2-6).

However, Viliūnas et al.'s study does not entirely undermine the importance of other aspects of the designed environment to the nighttime environment. The selection of plants, the inclusion and treatment of water, and the selection and design of amenities can all be done in such a way that makes the user feel comfortable and secure within urban corridor environment at night (Leendertz 2011). When designed integrally with lighting, a holistic landscape which cohesively meets the user's needs can be designed (Moyer 2013, 219-319; for more information about design details for nighttime environments, see the Annotated Bibliography appendix).

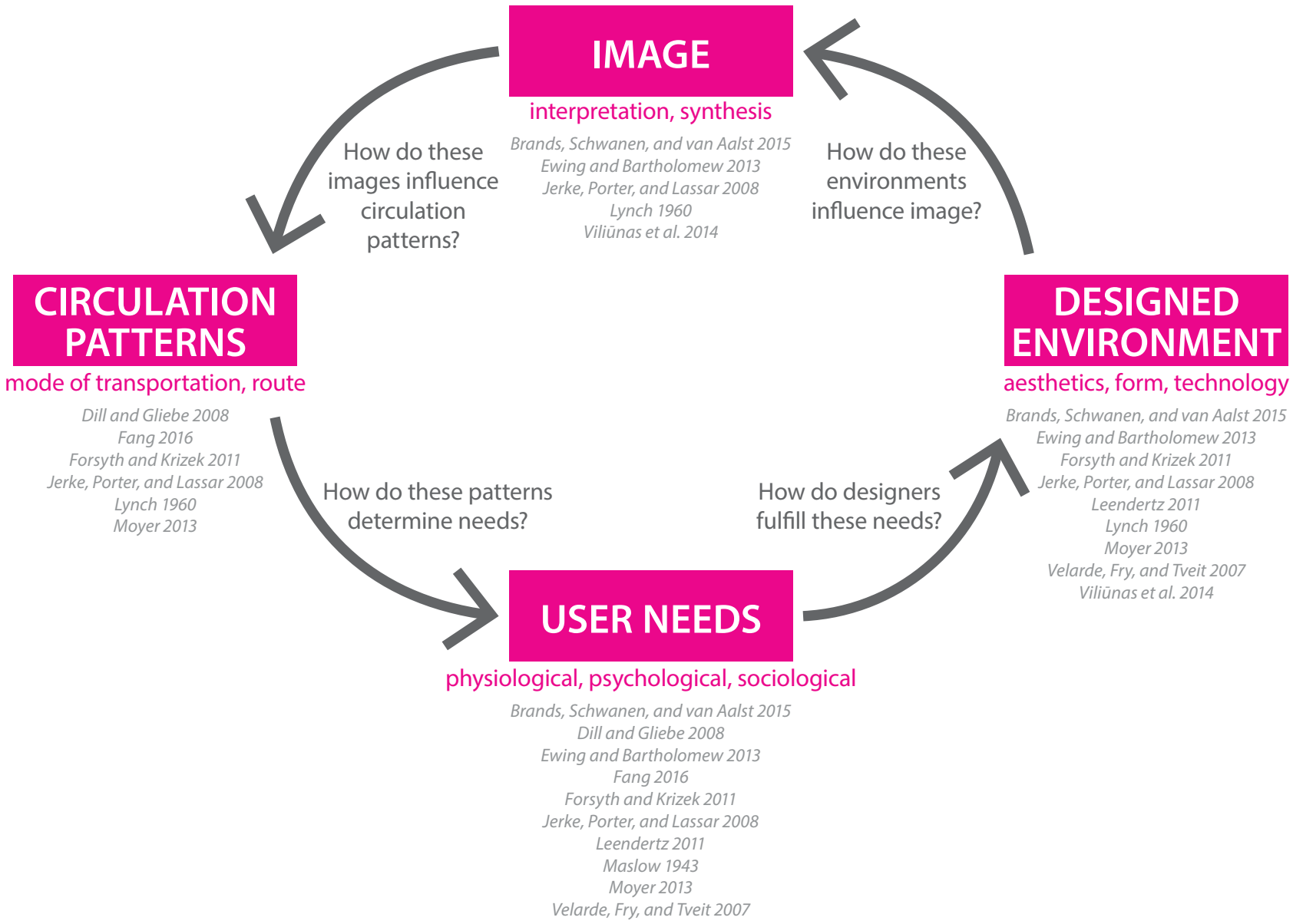


Figure 2.05 Synthesis of the literature into an understanding of the user's relationship to his or her environment

SYNTHESIS OF THE LITERATURE

The following takeaways can be extracted from the analysis above:

- An urban corridor user's individualized needs influence his or her circulation patterns (mode and route selection).
- Circulation patterns determine the design needs of an urban corridor environment.
- The user's image of an urban corridor environment is developed most directly from the way he or she interprets it.
- The user's image of an urban corridor environment creates a specific set of needs for him or her while using the environment.

These relationships are depicted by the literature map in Figure 2.05.

Project	User Needs	Design Response	Resulting Image	Ensuing Circulation	To apply...	To avoid...
Crowdus Street Pop-up Parks	**Sa** Sense of security **So** Community, entertainment	**Sa** Bright colors, larger concentrations of users **So** Group seating, nightly events	Attractive and youthful nightlife destination	Corridor as destination or through street; stationary activity	Mix of communal uses; stationary programming	
Dark Sky Discovery Trail	**Ph** Exercise **So** Exposure to nature, stimulation	**Ph** Maintained trails **So** Old growth forest, shoreline, elimination of light pollution	Awe-inspiring and intimate contact point with nature	Observation point at terminus as primary destination; some spaces too small for comfort	Nature experience; opportunity to escape light pollution	Narrow spaces with thick vegetation
East River Bikeway	**Sa** Routine, efficiency **So** Moments of awe in the mundane	**Sa** (Mostly) continuous route **So** Nature-like spaces, skyline views, proximity to water	Great concept for bicycle commute, but lacking in quality	High traffic at bottlenecks; possible interest in utilizing other routes	Possibility to tie into larger trail-only network	Bottlenecks; close proximity to fast-moving cars
Marsupial Bridge and Swing Park	**Ph** Refuge from elements **Sa** Sense of comfort **So** Adventure	**Ph** Routing of bridge **Sa** Swings, downlighting **So** Swings	Urban fountain of youth	More frequent use; use as a destination	Downlighting; play opportunities for all ages	Contained spaces away from highly visible adjacencies
Prinzessinnengärten	**Ph** Food, rest **Sa** Removal of fear **So** Pasttime, community	**Ph** Kitchen, seating **Sa** Succession, foster community **So** Vegetable gardens, seating	Multicultural confluence; simple, clean lifestyle	Everyday use and tourism entering neighborhood	Common user interests; vegetation to ease starkness	
Santa Fe Trail (Dallas)	**Ph** Shade **Sa** "Personal bubble," navigation **So** Access to commerce/nature	**Ph** Existing vegetation **Sa** Wide path, simple signage **So** Connect (to) popular districts	Popular leisure and exercise route for a diversity of users; fun of the trip is, in part, the journey itself	Districts as destination via trail	Wide path; well-planned wayfinding; promotion strategies	
Solar paving test projects	**Sa** Sustainable electricity (stakeholder need)	**Sa** New paving technology	Internationally-recognized pioneer in new technology	Continues without change; potential for added tourism	Underutilized technologies, if feasible	Untested technologies, if on a tight budget
Van Gogh-Roosegaarde Cycle Path	**Sa** Efficiency, sense of security **So** Stimulation	**Sa** Lighting (especially where necessary) **So** Element of awe	High-tech, practical, and unique bicycle route	Leisure ride with both natural and technological appeal	Lighting for inpiration; lighting for practicality	
Varsity Donuts Back Alley	**Ph** Food, rest **Sa** Sense of security **So** Community	**Ph** Food counter, seating **Sa** Enclosure w/ transparency **So** Movie screen, group seating	Safe alternative for late night entertainment	Corridor as destination; stationary activity	Communal space; stationary programming	

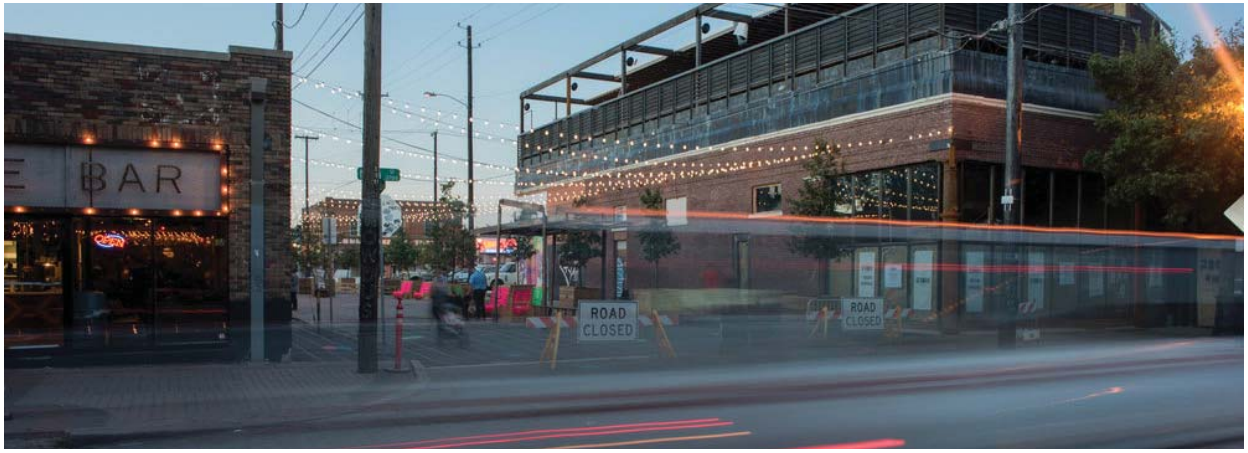
Table 2.01 Analysis of precedents; the left-hand items under User Needs and Design Response correspond to the categories in Figure 2.01 (*Ph* = physiological homeostasis, *Sa* = safety, and *So* = sociological well-being).

PRECEDENT ANALYSIS

The study of precedents can be a valuable tool to a designer, as it allows him or her to learn from the successes and failures of similar projects which have already been constructed. The precedents shown here are examples of designs which attempt to address one or more of the user needs found in the Trail environment (see the Findings chapter for an explanation of these needs). These precedents are either non-motorized corridors, situated in urban environments, or both. Each selected precedent was cycled through the literature map (Figure 2.05) to examine how the design responded to each of the literature map's components and determine its possible applications to the site. This process is documented in Table 2.01. This table generated several recurring themes, which can be applied to the Trail:

- A lighting system's design affects the image which is generated about the space.
- Appealing spaces cater to a wide variety of users.
- Users enjoy experiencing nature.
- Wider paths reduce congestion.
- The Trail could be tied into larger networks, like wayfinding schemes and master plans.

The analyzed precedents are displayed on the following pages.



CROWDUS STREET POP-UP PARKS

Location
Dallas, TX

Completed
2015, 2016

Designer(s)
CallisonRTKL, Design Future Dallas, Gensler, Studio Outside, TBG

Overview
To serve a community lacking in public open space, a series of socially initiated and donor funded temporary parks have turned an underutilized local street into a destination. The street connects a burgeoning mixed-use development with warehouse industries, and draws users from both. It provides users with an artistic and socially vibrant atmosphere to pass through as they circulate through an already walkable TOD. These temporary interventions are drawing users to Crowdus Street, transforming the image of the street from one that was once a poorly-planned backstreet in a neighborhood notorious for high crime rates.

Crowdus Street Park
This was a weekend which utilized wood pallets, lawn chairs, and artificial turf to provide an inexpensive and aesthetically pleasing environment for users. Live performances were included in the programming.

Reimagine Crowdus
Capitalizing on ideas from the previous installment and a local extra-professional design competition, this project was intended to pilot the validity of permanent transformations to the park. Bright colors, painted ground surfaces, custom furniture, pavilions, and nightly events made this 30-day installment of the park successful.

Relevance
This park provides an example of the design, funding, and implementation happening through social engagement. Elements and programming which are creatively unique but cohesive with the neighborhood are the primary contributors to its design success.

Sources
AIA 2016; Deep Ellum Foundation 2016a; Deep Ellum Foundation 2016b; Design Future Dallas 2016; D Magazine 2007; TBG Partners, Inc. 2015

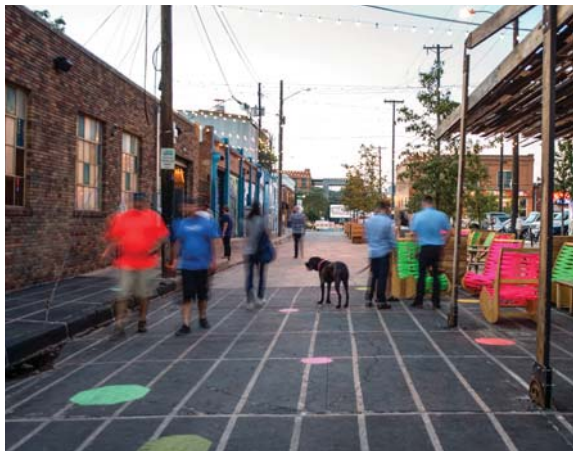
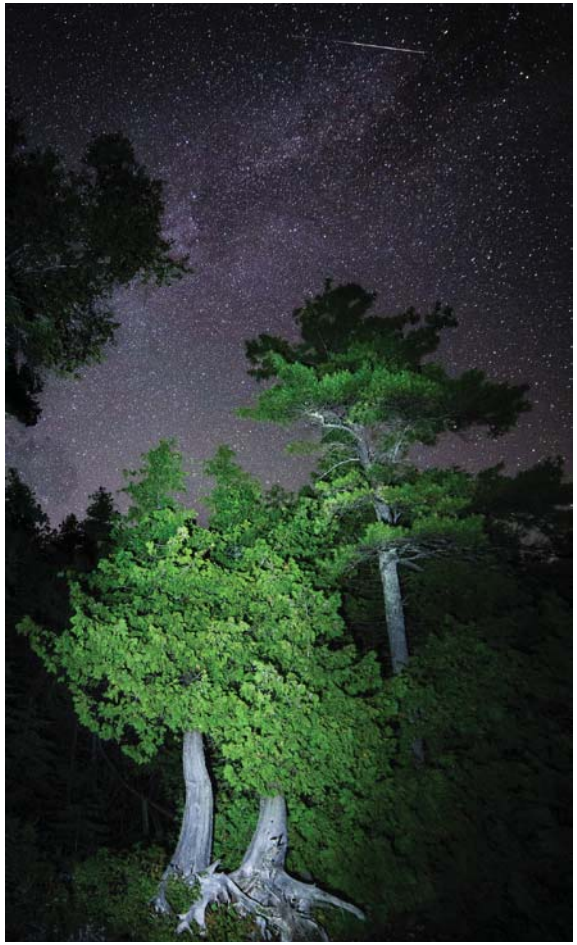


Figure 2.06 (top left) A user rests in an iconic rocking chair custom designed for Reimagine Crowdus; meanwhile, her dog is allowed to socialize with passersby (Studio Outside Landscape Architects, used with permission)

Figure 2.07 (top right) Transparency and signage allow drivers on nearby streets to quickly gain an understanding of programming occurring on Crowdus Street (Studio Outside Landscape Architects, used with permission)

Figure 2.08 (middle right) Users can circulate throughout the corridor with a high level of transparency to nearby indoor and outdoor programming (Studio Outside Landscape Architects, used with permission)



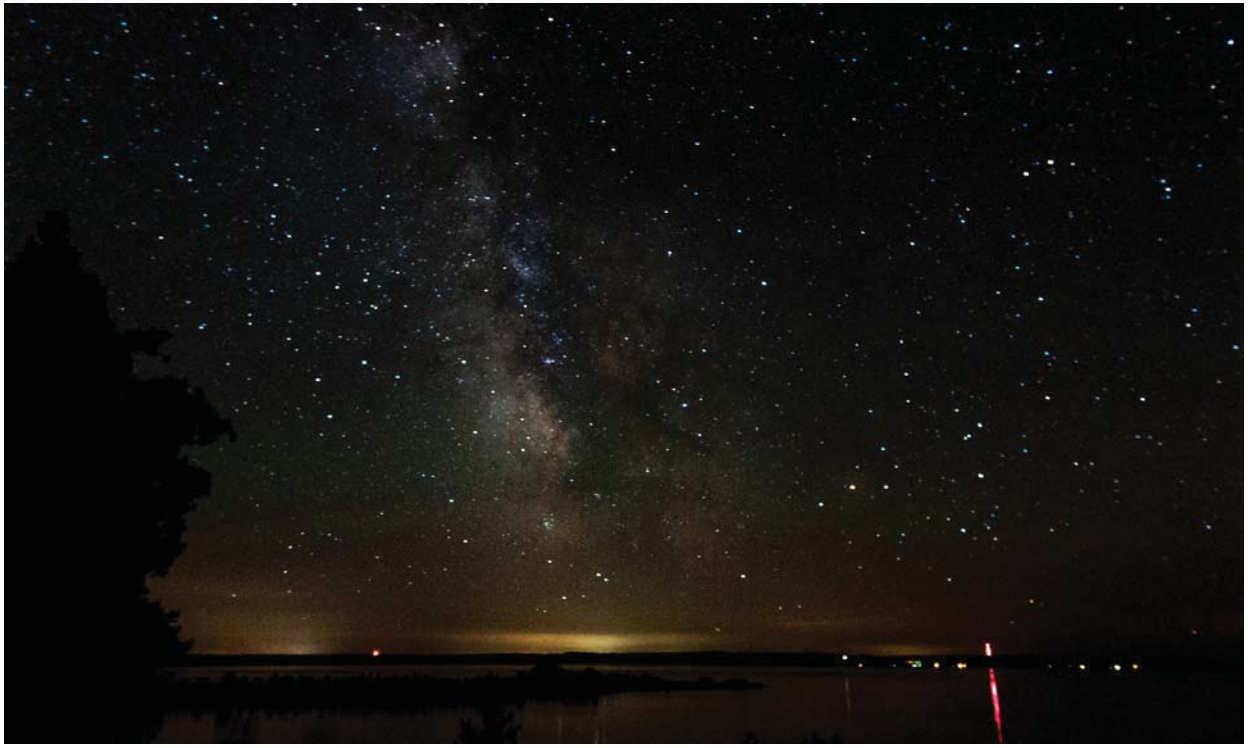


Figure 2.09 (top left) Overgrowth outlines a brilliant night sky along the trail (Smith 2015)

Figure 2.10 (top right) The Milky Way can be seen at the trail's shorefront terminus due to the preservation of dark sky on site (Slade 2014)

DARK SKY DISCOVERY TRAIL

Location
Mackinaw City, MI

Completed
2012

Designer(s)
Beth Anne Piehl (wayfinding), Emmet County Communication (wayfinding)

Overview
This is a one-mile trail within an International Dark Sky Park. It extends from the park entrance to an observation point of the adjacent bay. It exists to provide hikers an opportunity to experience nature without the interference of light pollution. Signage along the trail educates users about each planet in the solar system. At these signage nodes, there are also life-size images of characters significant to the planets and QR codes which give further audio commentary on the planets.

Relevance
Interactive signage and other forms of wayfinding may be worth incorporating into the trail experience. The nature-like quality of the Trail may also be worth preserving as is.

Sources
Headlands International Dark Sky Park 2016; TripAdvisor 2017

EAST RIVER GREENWAY

Location
New York, NY

Completed
1902–Present

Original Designer(s)
Calvert Vaux

Overview
This corridor is a popular bicycle route for both commute and leisure. It provides various nodes for users to interact with nature and observe city life (for example, sweeping views and benches for people watching). Although it connects Lower Manhattan to East Harlem, there are several stretches along the route which receive criticism: bottleneck thresholds, areas of frequent construction, the nearby presence of vehicular traffic, and disconnects where bicyclists are forced to enter street environments for several blocks at a time.

Site-Scale Relevance
At the site scale, the Trail should consistently be wide enough to satisfy the needs of the observed uses, especially if users need to pass one another. If and when construction or repair projects need to happen along the Trail, measures should be taken to ensure that commuters can continue about their chosen daily route without interruption. Additionally, environmental measures can be taken to enhance user comfort along and when crossing College Avenue, as opposed to the typical response of adding bollards.

City- and University-Scale Relevance
The Trail may be viewed as even more valuable and have the potential to draw additional users if it ties into a well-planned and -designed circulation system. This would allow commuters and leisure riders to enjoy the Trail experience as one of many "special" experiences along their route instead of being a unique moment of contact with nature.

Sources
Evans 2017; Foursquare 2017; Rails-to-Trails Conservancy 2017a; Serinsky 2012; Wachunas 2016; Yelp 2017a

Figure 2.11 (top left) A jogger and a walker are forced to circulate through a bottleneck next to traffic due to the necessity of repairing a sinkhole along the greenway (Jim.henderson 2009a)

Figure 2.12 (top right) Users circulating through a park environment along the greenway (Beyond My Ken 2010)

Figure 2.13 (middle right) Bicyclists are forced to wait their turn in a narrow part of the corridor; a highway exists immediately to the left of the users (Jim.henderson 2009b)

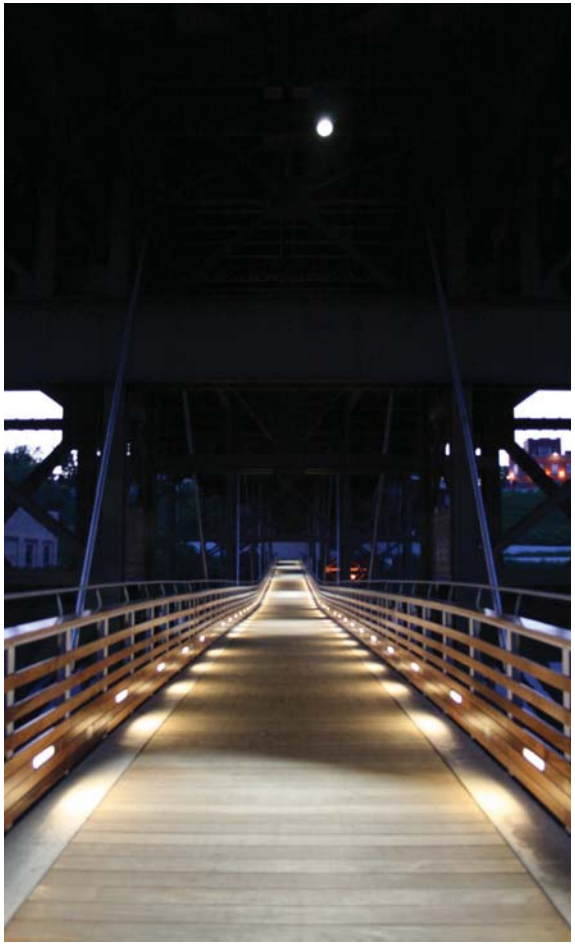


Figure 2.14 Downlighting on Marsupial Bridge (Jannene 2007)

Figure 2.15 Adults playing in the swing park (Benjamin 2016, used with permission)

MARSUPIAL BRIDGE AND SWING PARK

Location
Milwaukee, WI

Completed
2005, 2012, 2014

Designer(s)
La Dallman, Beintween

Overview
This bridge was constructed to provide a pedestrian connection across the Milwaukee River. Although ambient lighting does not reach the bridge very easily due to its location beneath a street bridge, downlighting allows users to use the bridge at night without a high contrast when viewing the path versus the surrounding landscape. Included in the original design was a "Media Garden," or projection screen and lit seating. Because the street bridge protects users from sun, rain, and snow, the Media Garden inevitably became a hot spot for the homeless, which discouraged other types of users from utilizing the programmed space. When a guerrilla urbanism group dangled swings from the street bottom in 2012, the Media Garden soon became a hot spot for families with children. Several years later, when the swings wore out, public outcry led local government to step in and replace the swings.

Relevance
Downlighting, from bollards for example, may be an effective method for illuminating the Trail. There may also be appeal to adding a sense of adventure to the Trail. Contained spaces which are removed from highly visible public areas may prove to become areas of concern.

Sources
Bamberger 2017; Faraj 2017; La Dallman 2017a; La Dallman 2017b; LISCMilwaukee 2015; Schumacher 2013; Schumacher 2014; Yelp 2017b

PRINZESSINNENGÄRTEN

Location
Berlin, Germany

Designer(s)
Nomadisch Grün

Completed
2009

Overview
This site was a vacant lot on a street which was unfrequented due to negative memories of the Berlin Wall, one block to the northwest. Several entrepreneurs bought the lot and constructed a community garden from milk crates and inexpensive lumber to transform it into a thriving community and social space. Vegetation was cleared, but mature and small-caliper trees were left, allowing shade without undergrowth. A shipping container was eventually converted to a farm-to-table food counter which the owners run, and picnic tables are set up nearby. An observation deck was eventually constructed to allow users sweeping views of the garden and neighborhood.

Relevance
Although this is not a corridor project, it is a powerful example of how landscape architecture can transform a widespread image of a place. It is similar in land area to the Trail, and provides a response to dealing with overgrowth in urban design. There may be a reason for the City to assign a universal name to the Trail too, so that the image is not lost in user's minds (see Conclusions chapter).

Sources
Google Inc. 2016; Klanten et al. 2012; Monocle 2010; ShareMap.org 2017

Figure 2.16 (top left) View of the surrounding neighborhood from an observation deck within the garden (Mazi Project 2016)

Figure 2.17 (top right) A user walks between clusters of vegetable crops; the chalkboard on the right-hand side displays upcoming events in the garden (Tribin 2013)

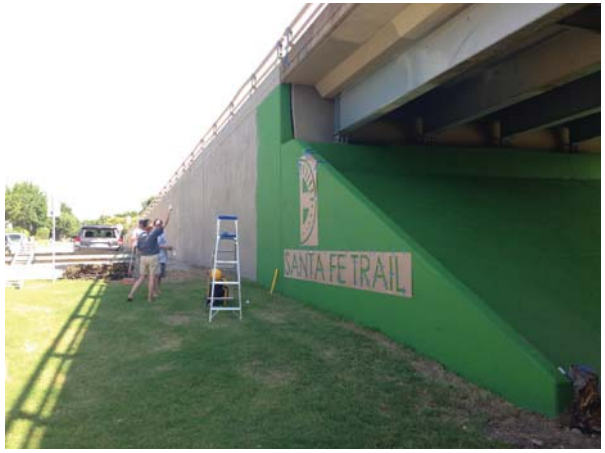


Figure 2.18 (top left) Some Friends of the trail paint an underpass, adding artistic flair to an otherwise neglected and contained space along the trail (see also: Marsupial Bridge and Swing Park) [friendsofsantafetrail 2013]

Figure 2.19 (top right) Pedestrian users on a sunny evening (friendsofsantafetrail 2010)

Figure 2.20 (middle left) Signage along the trail is used sparingly and intentionally; it features a minimal amount of landmarks and words and utilizes icons and arrows to communicate messages to bicyclists more efficiently than through words

SANTA FE TRAIL

Location
Dallas, TX

Completed
2009-2015

Designer(s)
GFF, Inc.

Overview
This former railroad corridor spans 5.3 miles, weaving through neighborhoods to connect one of Dallas's most popular mixed-use districts, Deep Ellum (see also: Crowdus Street Pop-up Parks), to its most popular nature recreation site, White Rock Lake. The trail itself consists of a 12-foot-wide concrete path throughout its entirety, allowing a bicyclist to pass two side-by-side bicyclists with ease. About one-third of the trail is surrounded by overgrown and natural conditions, but due to the trail's width, there are no tight thresholds. Much of the trail faces either the back sides of single- and multifamily housing complexes, some of which use the trail as a selling point for real estate. Marked street intersections help users find their way, along with simple signage at various points along the trail. A nonprofit Friends of Santa Fe Trail (FoSFT) was also established to promote the trail and catalyze improvements for it.

Relevance
A wide path may encourage users to feel safe both in passing other users and in keeping their distance from overgrowth. Signage, if used simply and sparingly, would likely aid the user wayfinding experience. Trail developments could be seen as a potential selling point for future residents. There may also be a reason to create a "Friends of the Trail" organization.

Sources
Friends of Santa Fe Trail 2017; friendsofsantafetrail 2017; GFF, Inc. 2017; Google Inc. 2016; Rails-to-Trails Conservancy 2017; Sullivan 2011

SOLAR PAVING TEST PROJECTS

Significant precedents
Bicycle path from Krommenie to Wormerveer, Netherlands
Road in Tourouvre-au-Perche, France
Sidewalk in Conway, MO

Completed
2014–Future

Manufacturer(s)
Various

Overview
Wide interest has arisen recently in the pioneering of solar paving technologies. The concept of the product, which is being used in several pilot studies across the globe, is a crack-proof glass with solar panels beneath. One variation of the product features built-in LED lighting. In theory, solar paving systems appear to be an effective method for utilizing dark and impermeable surfaces (see: "urban heat island" in the Glossary) for sustainable electricity generation. However, much of the technology is still in its initial stages, and the details of how to research its feasibility are still uncertain. The product is also currently very expensive.

Figure 2.21 A prototype of a solar paving parking area (Walden 2014)

Relevance
Integrating solar paving may be a practical option for a high-level intervention design scheme, due to its abundance of potential drawbacks despite its possibilities.

Sources
Eisenstein 2016; National Geographic 2016; Oltermann 2014; Brusaw 2014; Sorrel 2017; The Colas Group 2017

Figure 2.22 (top left) Additional lighting seen at one of the trail's turns (Oostrom 2014b)

Figure 2.23 (top right) LED lighting embedded in pavement (Oostrom 2014a)

VAN GOGH-ROOSEGAARDE CYCLE PATH

Location
Between Nuenen and Eindhoven, Netherlands

Designer(s)
Studio Roosegaarde

Completed
2014

Overview
This trail is an artistic tribute to the famous painter who grew up in the area. Blue and green solar-powered LEDs are embedded in the pavement, and a surface coating is applied. These lights illuminate a 0.3-mile portion of a larger trail that connects two towns. Additional LED lighting is provided along particularly dangerous corners, and because this lighting is powered by the national energy grid, these corners will remain lit when the pebble-like LEDs have not had a chance to charge.

Relevance
Because safety on the Trail is a concern, this could be an artistically creative way to encourage images of safety. There may also be validity in inserting an additional continuous datum into the Trail (besides the existing concrete footpath), which not only unifies the entire trail, but also connects it to contextual adjacencies. This precedent is very close in length to the Trail.

Sources
Holland.com 2016; Howarth 2014; NPR 2014

VARSITY DONUTS BACK ALLEY

Location
Manhattan, KS

Designer(s)
M.O.D. Architecture + Design

Completed
2012

Overview
While some of the other alleyways in the Aggieville bar district tend to be poorly lit, this narrow, zigzagging alleyway is lit entirely by festoon lighting. The cultural focus of the corridor is a dismantled food truck which provides unique, non-alcoholic options to locals after midnight. Custom wood panel furnishings and patio are integrated into the outsides of the truck. Patio heaters warm space in winter. Cartoons play from a projector onto an adjacent building. There are almost always patrons present, adding to the general perception of safety.

Relevance
This project is located 1.4 miles from the study site and is widely regarded by college students as one of the most appealing urban environments in the community at night. It provides a good glimpse into what is feasible for the Trail, given Manhattan's interests and economy.

Sources
The MHK 2016; Varsity Donuts 2016; Yelp 2017c

Figure 2.24 (top right) Clockwise from top left: movie screen, festoon lighting, lit identity piece with company name, iconic food counter, and transparent privacy wall

Figure 2.25 (top left) The transparent wall shields stationary users from parking lot while railings serve the same function for users waiting in the queue line (seen in background)

III

METHODOLOGY

OVERVIEW | SITE INVENTORY & ANALYSIS | SURVEYS | APPLICATION TO DESIGN ALTERNATIVES

III. METHODOLOGY

"To understand the role of environmental images in our own urban lives, it was necessary for us to look carefully at some city areas and to talk with their inhabitants."

— Kevin Lynch, *The Image of the City*, p. 14

OVERVIEW

This study consisted of two methods, each composed of several parts. A site inventory and analysis was conducted. This method consisted of photodocumentation, base drawing, a site and context inventory, observation and correspondence, and dérives by the author. In tandem with this first method, a survey of the users (intercept survey) and a survey of the stakeholders were conducted. Key findings from these methods are documented in the Findings chapter, and became the basis for the design alternatives. Figure 3.01 describes this workflow.

SITE INVENTORY & ANALYSIS

PHOTODOCUMENTATION

Since the City plans to modify the Trail environment, a visual inventory of the Trail environment before modifications are made was taken. This allowed visuals to be used in the site analysis process as well as for sketch overlays when designing. If future studies are conducted, this will also allow researchers to replicate the procedure and use these photographs for visual reference when comparing the changes that have been made to the existing site to the modified site conditions.

A measuring wheel was used to lay out station points every one hundred feet on the Trail, beginning with the westernmost access point, where the path abuts the College right-of-way. Irrigation flags were used to mark these station points in the adjacent landscaping. Chalk was used on the trail to denote the corresponding numerical nomenclature of the station points. Then, a high-resolution camera with a tripod was set to a lens height of four feet and nine inches (the default tripod setting) and used to take two photographs at each of the station points. Regardless of the direction the path led, it was centered in the photo, with one photograph facing the direction of College and the other facing the direction of Hillcrest. Photographs facing Hillcrest were labeled as "facing east" and photographs facing College were labeled as "facing west." This procedure was completed on a sunny afternoon in January using a lens set to a focal length of 18.0 mm, aperture of f/16.0, shutter speed of 1/80 second, and ISO sensitivity of 100. By standardizing the focal and exposure settings for each photograph and by taking all photographs within an hour time frame on a single day, all photodocumentation was completed using conditions which were nearly uniform.

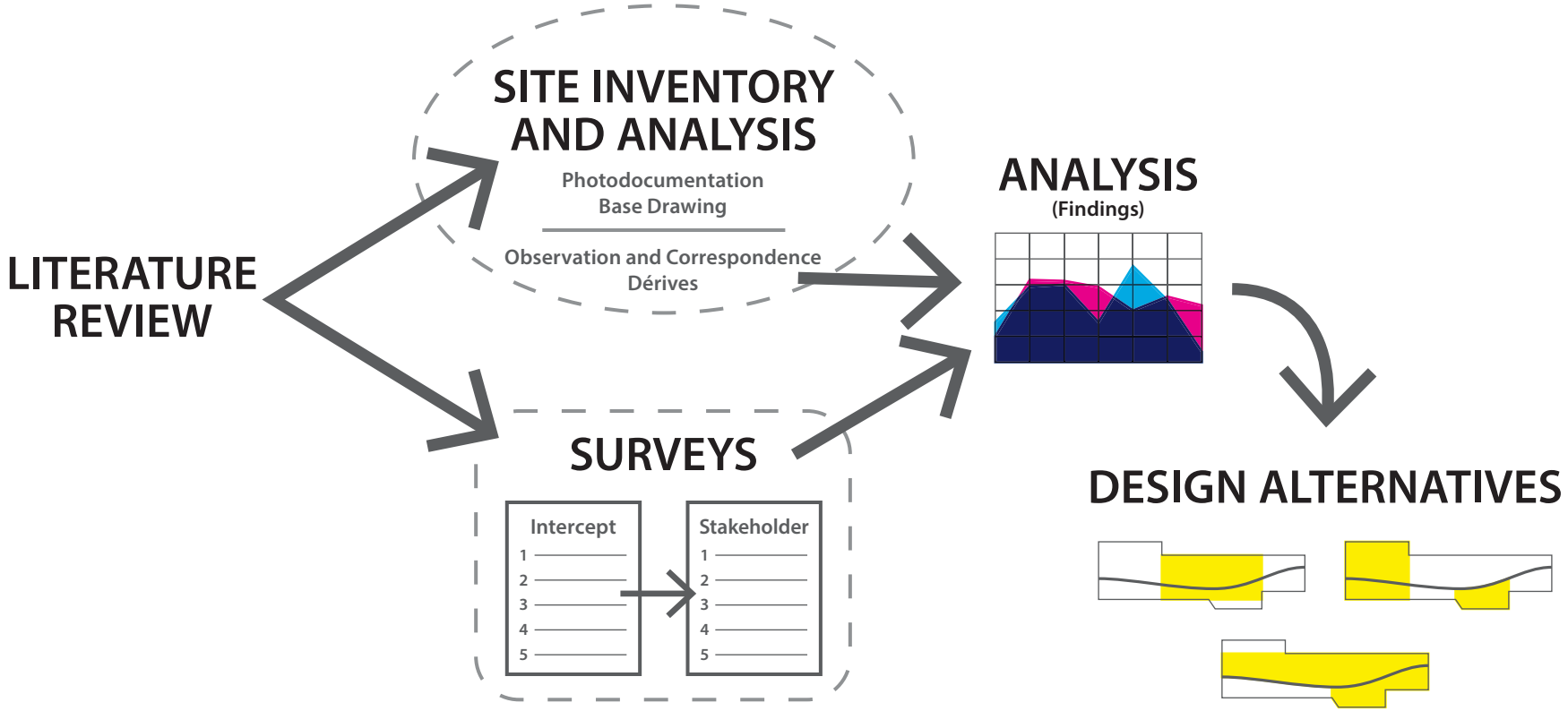


Figure 3.01 Methodology process and outcomes

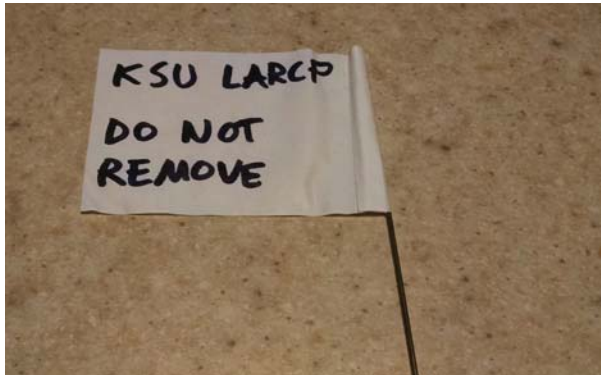


Figure 3.02 Irrigation flag used for marking station points

Figure 3.03 Chalked station point

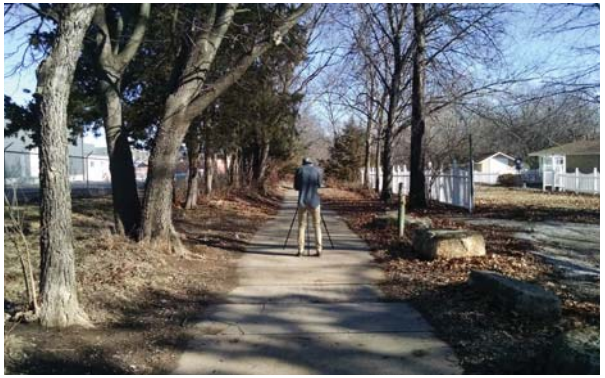


Figure 3.04 Taking the photographs; seen here at STA 08+00, facing east

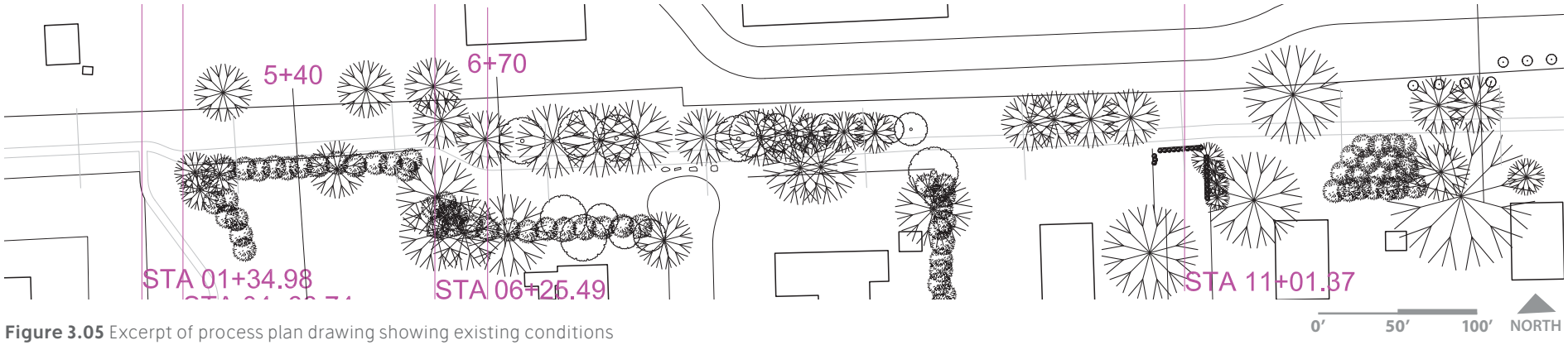


Figure 3.05 Excerpt of process plan drawing showing existing conditions

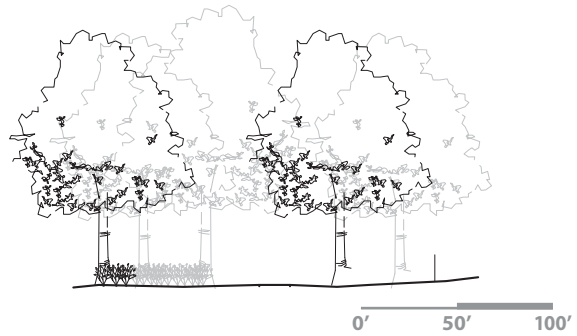


Figure 3.06 Process cross-section showing existing conditions, taken at STA 06+70, facing west

BASE DRAWING

After contacting the City and the University, it was discovered that technical drawings of the Trail environment were mostly non-existent. Drawings which did exist lacked consistency between sources. In order to understand spatial relationships of design elements, a plan and a series of sections were compiled. These drawings also served as "base" drawings during the design process: drawings of existing conditions upon which to develop designs. In combination with documented changes which occur as a result of future construction, these base drawings can also be used to provide technical information for future studies.

These drawings were developed in AutoCAD based on site and contextual CAD and Geographic Information Systems (GIS) files obtained from the City. These were 2016 aerial imagery, building footprints, and a topography (DEM) raster. The trail was outlined in AutoCAD based on the aerial imagery. The building footprints were imported from ArcMap into AutoCAD and aligned to the aerial imagery. Contour lines were generated in ArcMap based on the topography raster and

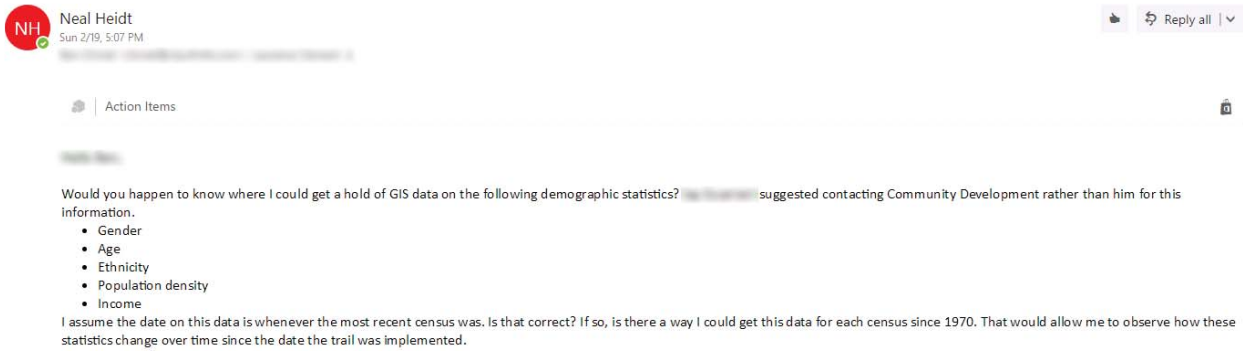


Figure 3.07 Excerpt of email correspondence with a stakeholder

exported and aligned to the AutoCAD model. Existing site fixtures and vegetation masses were then drawn in plan view in AutoCAD, based on the aerial imagery. From this plan, sections were taken. Heights of vegetation and building masses section view were generalized, based on those shown in Google Earth's "3D Buildings" feature and photographs from site visits. The full set of base drawings is displayed in the Base Drawings appendix.

OBSERVATION & CORRESPONDENCE

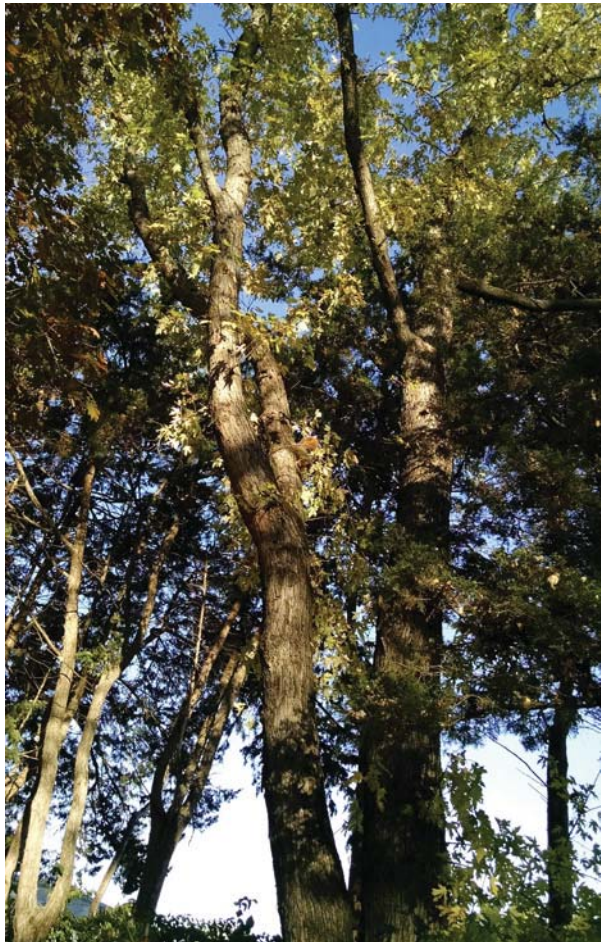
The purpose of this method was to observe the site and the users, as well as gather any additional data about the site which already exists. In order to provide the study with a third-person snapshot of the users' experiences and their relationship to their environment, notes were taken during the intercept survey which documented the following items:

- User behavioral patterns
- Site conditions which affected these patterns
- Candid, informal conversations with users about the Trail ("informal interviews")

An additional site visit was conducted to inventory the following landscape-specific qualities which had not already been documented (see Lynch & Hack 1984, 420-425 for full inventory checklist):

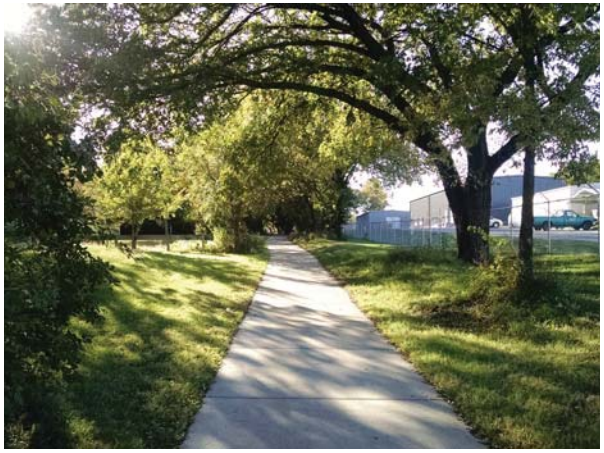
- Physiography and Hydrography
- Climate and Ecology
- History
- Infrastructure
- Constraints for Development
- Sensory Qualities
- Contextual Influences

These notes were collected using preliminary base plans on a clipboard. In instances where these procedures still did not provide adequate information, emails, phone calls, and in-person conversations with stakeholders were able to provide the study with adequate quantitative and qualitative data. All raw data collected during these procedures are displayed in the Site & User Observation, Site History, and Additional GIS Data appendices.




Please leash
and clean up
after your dog
Manhattan, Kansas
City Ordinance 6-24a


SHARE
THE ROAD



DÉRIVES

While observation and correspondence documented the users and the site from a third-person perspective, a first-person experience of the site was necessary to provide the study with an experiential perspective to supplement the empathetic approach of the informal interviews. Each dérive had a predetermined purpose: the author experienced the site in early morning, in the afternoon, and at night; in the rain and in dry conditions; on foot and on a bicycle; and in both cold and warm weather. However, circulation patterns were determined impulsively by the author on site, allowing the author to remove himself from the mindset of data collection and experience moments and phenomena on the Trail as a user might. Several different access points were also utilized between the dérives, giving each one a unique route.

Roughly a dozen dérives were conducted by the author during this study. The findings from this procedure were documented through memories (see "sociological well-being" in the Glossary) and photographs taken on a cell phone camera.

Figure 3.08 Moments encountered while on dérive

Figure 3.09 Taking photographs of various lighting scenarios for surveys

Figure 3.10 Stationary intercept setup

Figure 3.11 Intercept survey awareness letter distributed to residents

SURVEYS

INTERCEPT SURVEY

A survey of existing users was conducted in order to gauge their usage patterns and perceptions of the Trail. This provided the study with anonymous quantitative data on current user trends. This survey consisted of three sections. In the first section, each participant was given a series of potential usage patterns, and asked to evaluate their current habits according to their experience of the Trail. In the second section, each participant was given several sets of randomly-ordered photographs depicting security measures, vegetation scenarios, and lighting scenarios, and asked to rate each photograph on a Likert scale of "very unsafe" to "very safe" based on how each photograph made them feel. The third section consisted of a series of demographic questions, asked with the intent of finding correlations between this data and that of the first two sections. Following the third section was a box in which participants could type any comments, questions, concerns, or suggestions they had in regards to the Trail. All data for participants under age 18 was discarded. The full results of this survey are documented in the Intercept Survey appendix. This survey was also used to inform the stakeholder survey.

The author set up a lawn chair at various locations along the trail (which are documented in the Site & User Observation appendix), and verbally asked each user who passed by if he or she could spare three minutes to participate in a Qualtrics survey on an iPad. On several occasions, Trail users were not intercepted: in instances where large crowds were using the trail and it was impossible to intercept every user, in some instances where a significantly long queue line was forming, and in instances where users refused to participate in the study.

This survey was conducted during 21 unique weekday hours (5 am-2 am) and 21 unique weekend hours (5 am-2 am), elapsed over two weeks and aggregated into twelve 2- to 5-hour sessions. Included in these sessions were morning and evening rush hours, the second half and postgame of a nationally-televised Division I football game at the nearby University stadium, the second half and postgame of a preseason basketball game, and a change from Daylight Time to Standard Time. A

Figure 3.12 Intercept survey advertisement posted at each access point; this one was posted using bungee cords on the guardrail at Pipher and lit with clip-on book lamp

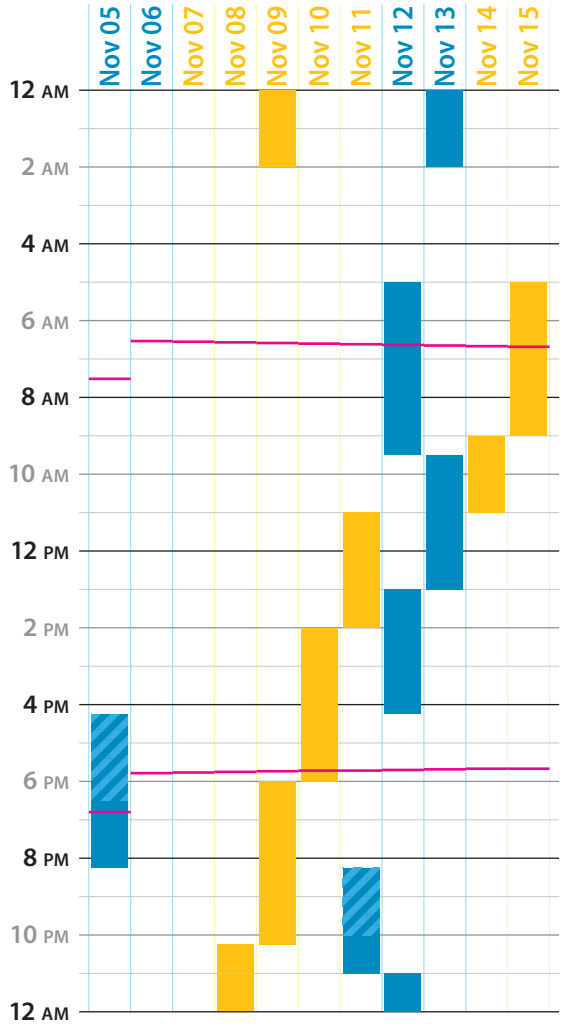


Figure 3.13 Schedule of intercept survey sessions; weekends are indicated in cyan and weekdays are indicated in yellow; diagonal stripes indicate the ongoing occurrence of a football or men's basketball game during the survey session; magenta lines indicate civil twilight (sunrise and sunset times from Time and Date AS 2017)

full breakdown of these times is given in the Site & User Observation appendix. To maintain a sense of security among residents and preserve the safety of the author, an informational packet explaining the purpose and setup of the survey was distributed to the northernmost four residences on University, Pipher, Hartford, and Hillcrest (Figure 3.11). This packet was also distributed to the residents of Collegiate Villa in PDF format via email. It was not, however, distributed to the residents of Jardine, due to a misunderstanding during pre-survey correspondence.

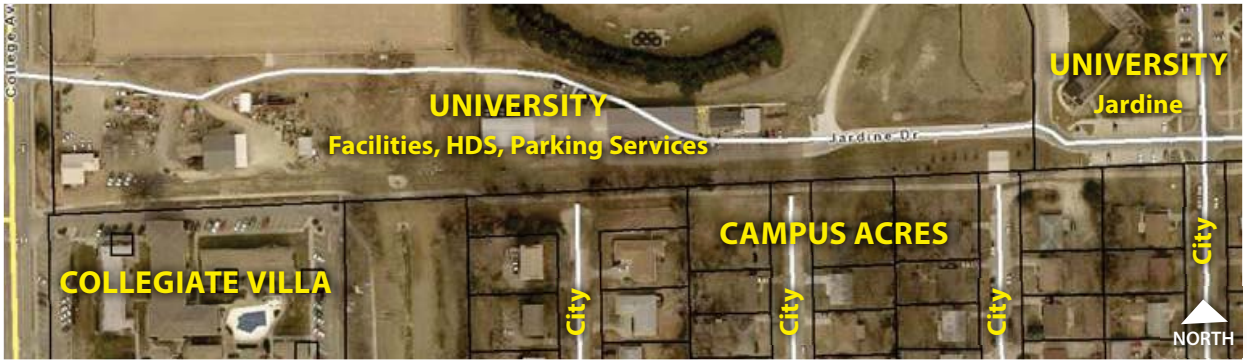


Figure 3.14 Property owners surrounding and including the Trail (adapted from Riley County 2017)

Figure 3.15 Stakeholder survey information and advertisement left for unresponsive residents

STAKEHOLDER SURVEY

A second Qualtrics survey was conducted to anonymously gauge stakeholders' perceptions of the Trail and potential changes to it. This survey consisted of two sections. The first section asked for the participant's stakeholder affiliation (which party or private entity he or she responded on behalf of) and a Likert-scale evaluation of whether he or she viewed the trail as "an asset" or "a liability." The second section consisted of several sets of randomly-ordered photographs and randomly-ordered descriptions of program activities, and asked the participant to evaluate, on a Likert scale, whether he or she thought the implementation of each of these interventions to the Trail would make the Trail "more of a liability" or "more of an asset." The photographs chosen for this survey were those which had achieved a determinately positive result on the intercept survey (upper-bound confidence interval was lower than all other photos of the same classification). The program descriptions included in this survey were based on key findings drawn from the usage patterns and demographics sections of the intercept survey.

Following the second section was a box in which participants could type any comments, questions, concerns, or suggestions they had in regards to the Trail. The full results of this survey are documented in the Stakeholder Survey appendix.

A list of landlords, tenants, owners, operators, advisory committees, and other relevant parties was developed through an inventory of property ownership GIS data from the Site Inventory and Analysis (Figure 3.14) and further refined through conversations with these property owners. Stakeholders were then contacted to determine the most effective procedure for eliciting a response and to understand the organizational structure of the party. For all stakeholder parties, surveys were sent to the top 1 to 3 levels of management, depending on the party's structure (for example, Manager, Assistant Manager, and Supervisor). Procedures utilized included in-person appointments to conduct the survey on an iPad, distribution directly to stakeholders of the survey through email hyperlink, or utilizing contacts within the stakeholder parties who had a previous connection to the study to forward the email to their superiors.

This latter procedure was utilized in instances where some amount of internal rapport would be necessary to elicit participation from the intended respondent. The author was also carbon copied on most of these internally-distributed surveys.

However, for resident-owners and residential tenants, this procedure could not be followed, due to a lack of organizational hierarchy and an interest in maintaining these stakeholders' anonymity. Instead, the author canvassed the single-family bungalows immediately adjacent to the Trail, distributing an informational packet with a URL address through which to take the survey online. Residents who answered their door were also given the opportunity to take the survey at that moment on an iPad. For non-resident landlords of Campus Acres, this same packet containing the URL address to take the survey was sent via postal mail to the address obtained through the GIS data previously described. For residents of Collegiate Villa and Jardine, mass emails were distributed to residents via a property manager. These emails were nearly identical to the previously-described emails.

APPLICATION TO DESIGN ALTERNATIVES

Each method described in this chapter provided insights into the design process. Analysis of these methods is given in the Findings chapter. In the Design Alternatives chapter, rationales are provided which explain how these findings are translated into design modifications.

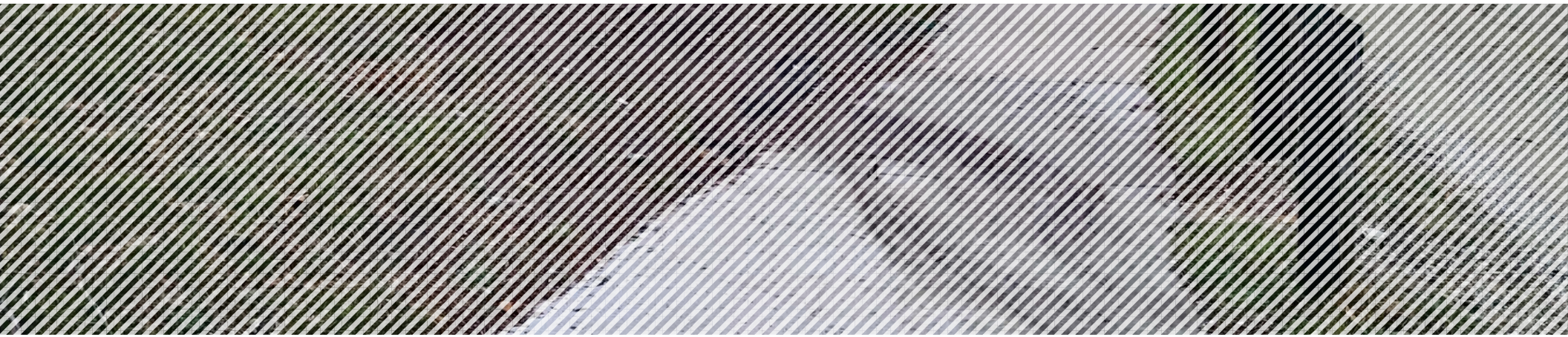
Campus Acres *(9 total)*	Resident-homeowner	**3**
	Residential tenant	**6**
City of Manhattan *(11 total)*	City/University Special Projects Fund Committee	**7**
	Community Development Department	**2**
	Parks & Recreation Advisory Board	**1**
	Urban Area Planning Board	**1**
Collegiate Villa	Prime Place Employee	**3**
Kansas State University *(36 total)*	Housing and Dining Administration	**6**
	Housing and Dining Facilities	**9**
	Housing and Dining employee, other	**1**
	Jardine residents	**14**
	Landscape Services	**3**
	Planning, Project & Space Management	**3**
Riley County	Consolidated Law Enforcement	**1**
Other	(unspecified)	**3**

Table 3.01 Complete tally of participating stakeholders

IV

FINDINGS

OVERVIEW | SITE INVENTORY & ANALYSIS | SURVEYS



IV. FINDINGS

"Mom, are we going into the Tunnel?"

— Toddler encountered on the Trail

OVERVIEW

A vast amount of data already exists or can be easily collected about the site. Much of this data, while interesting trivia, could not directly apply to the physical design needs of the site and this project, as determined by the methods; therefore much of the data was considered irrelevant to design. In order to arrive at this conclusion, each piece of data collected through the methods was analyzed for its ability to answer the research question. This chapter lays out the findings from the collected data which can be applied to the design process. Additional intervention considerations which were revealed are discussed in the Discussion chapter, and additional findings unrelated to the site's design needs are detailed in the appendices.

SITE INVENTORY & ANALYSIS

OBSERVATION & CORRESPONDENCE

Based on a high quantity of comments by users and stakeholders in the surveys (discussed later in this chapter) and informal interviews addressing two specific regions of the Trail, it was determined that these regions would be the focus of the observation in the site visits. These regions are "the Tunnel" (roughly STA 06+00 to STA 08+00) and "the Low Water Crossing" (roughly STA 13+50 to STA 15+00; the names for these regions were coined by users). The following paragraphs describe the existing conditions of the Trail, particularly within these two regions, as found through all observation and correspondence methods.

The Tunnel is the longest continuous, completely-enclosed span of path along the Trail. Mature trees, likely ranging in age from 50 years to over 100 years border the path to the north and south. The west threshold of this space is a sharp bend in the path where, due to visibility angles and the presence of vegetation, the user cannot see their upcoming route within the Tunnel until about 30 feet before entering it. The eastern threshold of the Tunnel is an elevation high point, which the user cannot see the ground beyond it until within about 100 feet of arriving at this high point. In the summer months, when vegetation is filled out, the Tunnel is the only portion of the Trail which is not infiltrated by external ambient lighting at night. User narratives of the Tunnel include abrupt encounters with bicyclists, an opossum, and a streaker who had been hiding in the undergrowth.

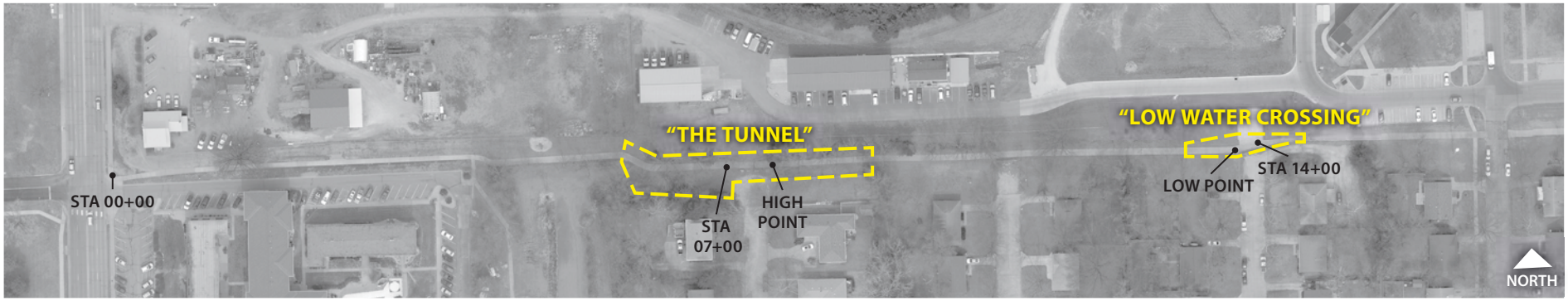


Figure 4.01 Locations of significant regions within the Trail (adapted from Guarneri 2017)

Figure 4.02 View into the Tunnel from outside, taken facing east

Figure 4.03 View out of the Tunnel from inside, taken facing west; the southwest drainage basin can be seen beyond the vegetation on the left

Figure 4.04 View of the Tunnel's thickest vegetation from its high point, taken facing west

Figure 4.05 View into the Tunnel from outside, taken facing west; the high point can be seen on the horizon

Figure 4.06 View into the Low Water Crossing from ~STA 16+00; the cowpath runs between Hartford (beyond the driveway at left) and Jardine/Kerr (at right)

Figure 4.07 The Low Water Crossing after a rain storm, taken facing east; the concrete overflow can be seen on the left with the cow path beyond it; Hartford is at right

Figure 4.08 Cow path with erosion draining onto paved path

Figure 4.09 Evidence of slipping joggers and bicyclists at the confluence of the paved path and cow path

The Low Water Crossing is the lowest region of the trail. Storms cause water and erosion from the slopes east and west of this region to pond in the lowest point in this region. It is also the junction between Hartford and the Trail and includes the base of a concrete 100-year flood emergency overflow for the northeast drainage basin. This low point is one of the most circulated regions of the site, especially among Athletics traffic. On one occasion, users were also observed utilizing the concrete overflow as a skateboarding quarter pipe. Due to an infrequency of maintenance along the trail, water and mud typically stays in this location until it has evaporated and dried or been washed away by another storm. A storm sewer line exists directly beneath the ponding (Figure 4.10), but there is no drain to remove the water. Much to the distaste of several users, a "cow path" also exists to the northeast of this low point. This cow path has created a seventh access point to the Trail where users have trampled the vegetation and thus compacted the soil beyond repair. This cow path primarily exists as a result of users circulating to the football and basketball stadiums (via Kerr) from Hartford and the Trail's eastern portions, and vice versa. In heavy storms, this cow path also erodes into the path. One user's story and the presence of unweathered concrete provide evidence that the area was re-graded within the last decade to minimize this issue, but still no drain inlet or grading strategy exists to remove water and debris from this area. If the circulation route was redesigned to avoid the lower area entirely, the concrete overflow would need to be modified in some way to make circulation over it possible, as it currently features a retaining wall on each side.

There are several other infrastructural considerations which should be made in the design process of the Trail. While to the east of STA 04+50 the path is 8 feet wide, a minimal distance for three people to walk side-by-side (Rearick 2017) or for a gator to pass single-file pedestrian traffic (Toburen 2017), the path is 6 feet wide to the west of this station point. The dead ends at University and Pipher provide limited opportunities for vehicles to turn around, as these are dead-end streets with physical barriers to the Trail that are restricting to vehicles with large turn radii. Cow paths also exist which connect these dead ends to the Trail path. Utility lines enter the site near the westernmost and easternmost access points, but do not exist throughout most of the site (Hays 2017, site observation). While copper wire would be an effective transmitter of electricity into the site (Hageman 2017), laying these lines in the darkest

Figure 4.10 Locations of significant utilities, with the Trail highlighted in yellow; on the top map, storm sewer and inlets are indicated in cyan and manholes in magenta (adapted from Guarneri 2017); on the bottom map, electricity lines are indicated in red (adapted from Westar Energy 2017); at right, utility lines are seen entering the ground near Jardine Drive

Figure 4.11 Delivery vehicle attempting to make a 3-point turn at the dead end of University Drive where it meets the Trail at the Tunnel; a cow path can be seen in the foreground

areas of the trail would cause interference with tree roots, and hanging them would cause interference with the branches. Fiber optics could also serve as a practical form of light energy transport, but only for computerized lighting control systems and not for lighting itself, as the necessary size fiber for light-only transport across the site is not currently mass produced (Hageman 2017). Solar energy collection appears therefore to be the most feasible method to bring electricity into the central portions of the site. However, PV cells must be implemented in such a way that minimizes interference with vegetation in order to provide a light source which visually reaches the path and does not require more pruning than the trees on site already require. In addition, inexpensive motion sensors exist which can automate the lighting system's on-off settings and therefore reduce the required amount of electricity which must be stored in the battery cells of solar collection devices. One example of this sensor is the type which a homeowner might place outside his or her house for security (Hageman 2017).

Some users are very outspoken about their belief that the natural ecology of the Trail environment should be preserved. Vegetation on the Trail is composed of three main types: turf grass; undergrowth, primarily honeysuckle (***Lonicera mackii)*** and wintercreeper (***Euonymus fortunei***); and canopy trees, primarily cedar (***Juniperus virginiana***), elm (***Ulmus*** spp.), and maple (***Acer*** spp.). Wildlife species observed along the Trail include blue jays, cardinals, robins, rabbits, and squirrels. Dried leaves and garbage scraps, including fast food packaging and Athletics tickets, also appear to have a constant presence along the sides of the path, as well as an occasional pile of festering canine excrement.

Some data also exists about the cultural aspects of the site. Over time, the site has been used as the campus of two colleges, precursors of the University as it exists today, along with the homesteads of their professors (gathered from 23 sources, all of which can be found in the Site History appendix). Remnants of these eras exist throughout the Trail. Because the Trail is 40 to 50 years old, some users were able to reminisce about their use or a loved one's use of Trail in past decades. Today, stakeholders and users vary widely in ethnicity and intention for use, primarily among the residents of the Jardine complex. Nearby residents sometimes visited the Trail with young children and/or noted their use of the Trail to access retail, work, or other amenities throughout Manhattan. Additionally, the Trail is used as the 12-mile marker of the Bill Snyder Highway Half race every May (Manhattan Running Company 2017).

Figure 4.12 Fallen debris from elm trees after a rainstorm

Figure 4.13 Accumulating leaves and garbage along fence in fall; taken near STA 06+00

Figure 4.14 The orange-colored fence post at left remains from the 1960s, when the Tunnel was used as a shelterbelt.

Figure 4.15 Collection of signs and poles at the Trail's easternmost access point at Hillcrest

Figure 4.16 Baseball stadium lighting, as seen during February from the Tunnel (taken using flash)

Figure 4.17 Vegetation around Pipher guardrail preventing nearby streetlights from infiltrating Trail (photo taken in November after some leaves had fallen)

DÉRIVES

In addition to the previously discussed portions of site inventory and analysis, the dérives revealed several other phenomena. Sucker and volunteer vegetation along the guardrails on Pipher prevent ambient light from reaching the Trail for a short span (Figure 4.17). In February and March, when the baseball stadium is in use at night but the Tunnel's vegetation has not yet filled out, ambient light from the baseball stadium is able to infiltrate the Tunnel. The pair of fences on both sides of the path at STA 05+00 are made of chain link and capped with barbed wire and spikes, almost as if to imply that the user is "behind something," or should not be using the Trail (see also: Marsupial Bridge precedent). Spatial discontinuity exists between STA 08+00 and STA 14+00 due to the variation in form of vegetation massings and the openness of the 1541 Pipher backyard to the Trail compared to its immediate neighbors. The south slope of the northeast drainage basin, where it abuts the path, is currently the only unutilized open lawn along the Trail, and provides the only potential for a hilltop-like overlook. There is no specifically-programmed seating throughout the Trail. At the Hillcrest access point, 5 different signs, a tornado siren, and a power pole all exist within 50 feet of the sidewalk intersection. This creates visual discord and complexity, preventing users and street drivers from efficiently understanding the rules they must abide by. Additionally, none of these signs directs users to nearby amenities or landmarks.

SURVEYS

INTERCEPT SURVEY

200 eligible trail users participated in the intercept survey, and from this data, several findings were revealed about the types of environments which users view as "unsafe" and "safe." The results were evaluated at a 95-percent confidence level, comparing upper- and lower-bound confidence intervals in search of determinacy that one or several types were more favorable for safety than their counterparts. Among the five lighting types displayed, images of in-ground lighting were determinately viewed as much more unsafe than the other four. Images of uplighting and overhead pole lighting were viewed as creating safer environments than those with festoons and bollards. Images of overgrowth were determinately chosen as the least safe among three vegetation choices, both during the day and at night (Figure 4.23).

Figure 4.18 Image of open lawn used in surveys (Peter 2017)

Figure 4.19 Image of manicured vegetation used in surveys (Raymond 2011)

Figure 4.20 Image of uplighting used in surveys (bradleypjohnson 2011)

Figure 4.21 Image of bollard lighting used in surveys (Wilson 2016)

Figure 4.22 Image of overhead pole lighting used in surveys (Wilson 2016)

Post-survey written comments primarily expressed an eagerness for lighting to be implemented, the unsightliness of the cow path near the concrete overflow, a desire to resolve the erosion issues at the Trail's lowest point, and a desire for the trail to be more frequently maintained. Although questions on the intercept survey also addressed user age, ethnicity, gender, habits, and destinations; usage frequency; and perception of safety of the existing Trail, the results from these questions provided no significant backing for other claims to be made from the data. Additionally, the author made a programming error regarding a question about perceived safety of call boxes versus security cameras, invalidating the question; both security types were therefore used again in the stakeholder survey.

STAKEHOLDER SURVEY

Results from the 63 eligible stakeholders were also evaluated at a 95-percent confidence level, and upper- and lower-bound confidence intervals were compared. These results revealed that program, lighting, and vegetation type as either an asset or a liability are indeterminate among stakeholders, with the two exceptions: among the 23 participating residents, manicured vegetation and security call boxes were viewed determinately as assets among residents over open lawns and security cameras respectively. This statistical comparison also revealed that several of the photograph types are viewed as greater potential liabilities among stakeholders than other types. These types are festoon lighting; programming for stationary activities (examples given to participants were bicycle parking and food trucks); among residents, larger concentrations of users at one time; and among the 37 participating landowners and land-operators (excluding residents), after-dusk use. Residents also viewed use before dawn, by bicyclists, and by those accessing the Athletics complex as greater potential liabilities than use for recreation/leisure and by runners; and they viewed overhead pole lighting as a greater liability than bollard lighting (Figures 4.24-4.26).

The post-survey written comments expressed by stakeholders reinforced the same tenets shared by many users. Additionally, the following interventions were suggested:

- "Celebrating" the Trail somehow
- Direct connections to Athletics complex
- Pedestrian stoplight at College
- Pet clean-up bags and trash cans
- Retrofitted access points

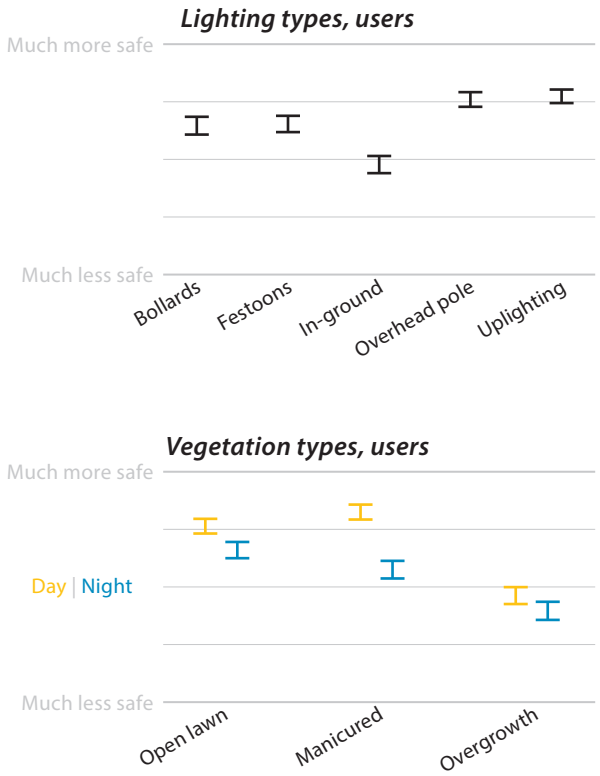
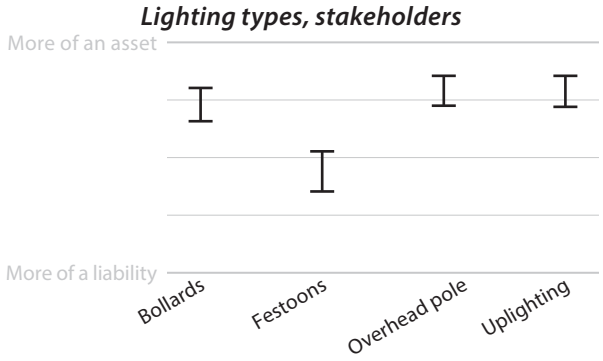


Figure 4.23 Intercept survey confidence intervals, measured at 95% confidence (stakeholder survey confidence intervals displayed on following pages)



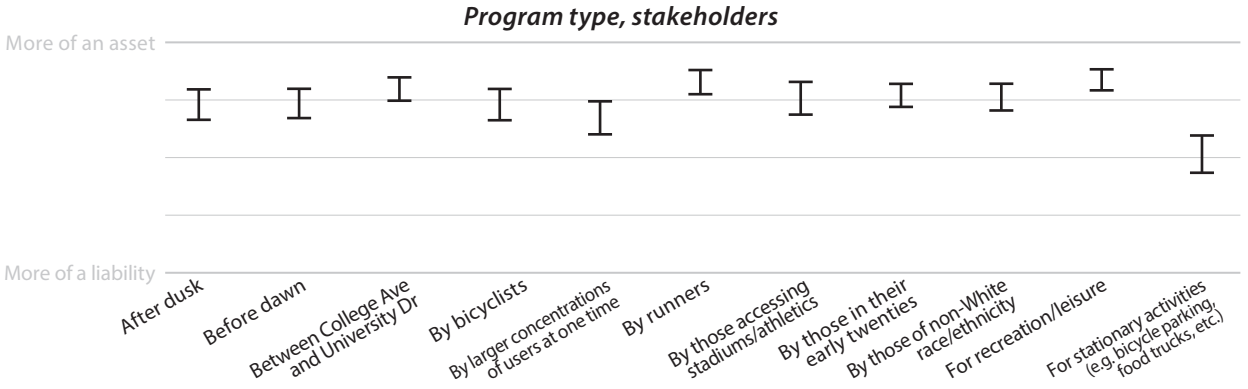


Figure 4.24 Stakeholder survey confidence intervals, measured at 95% confidence

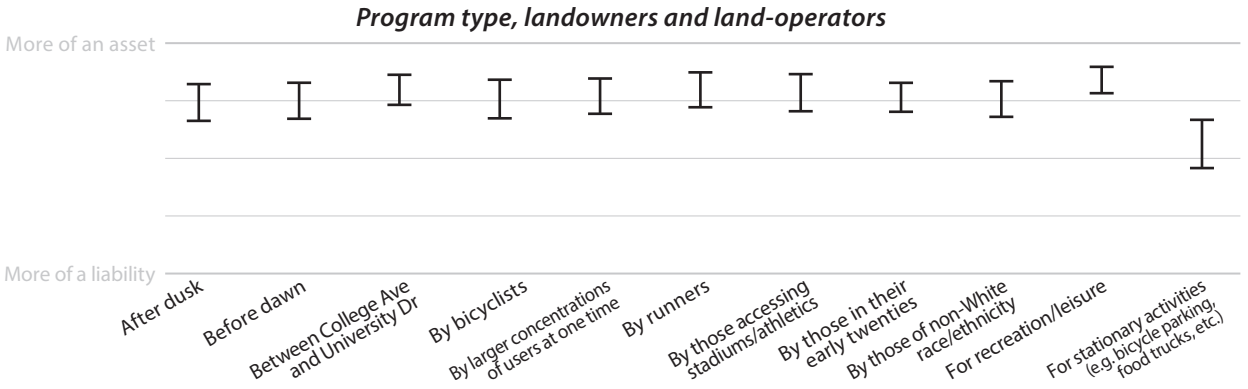


Figure 4.25 Stakeholder survey confidence intervals for landowners and land-operators (non-residents), measured at 95% confidence

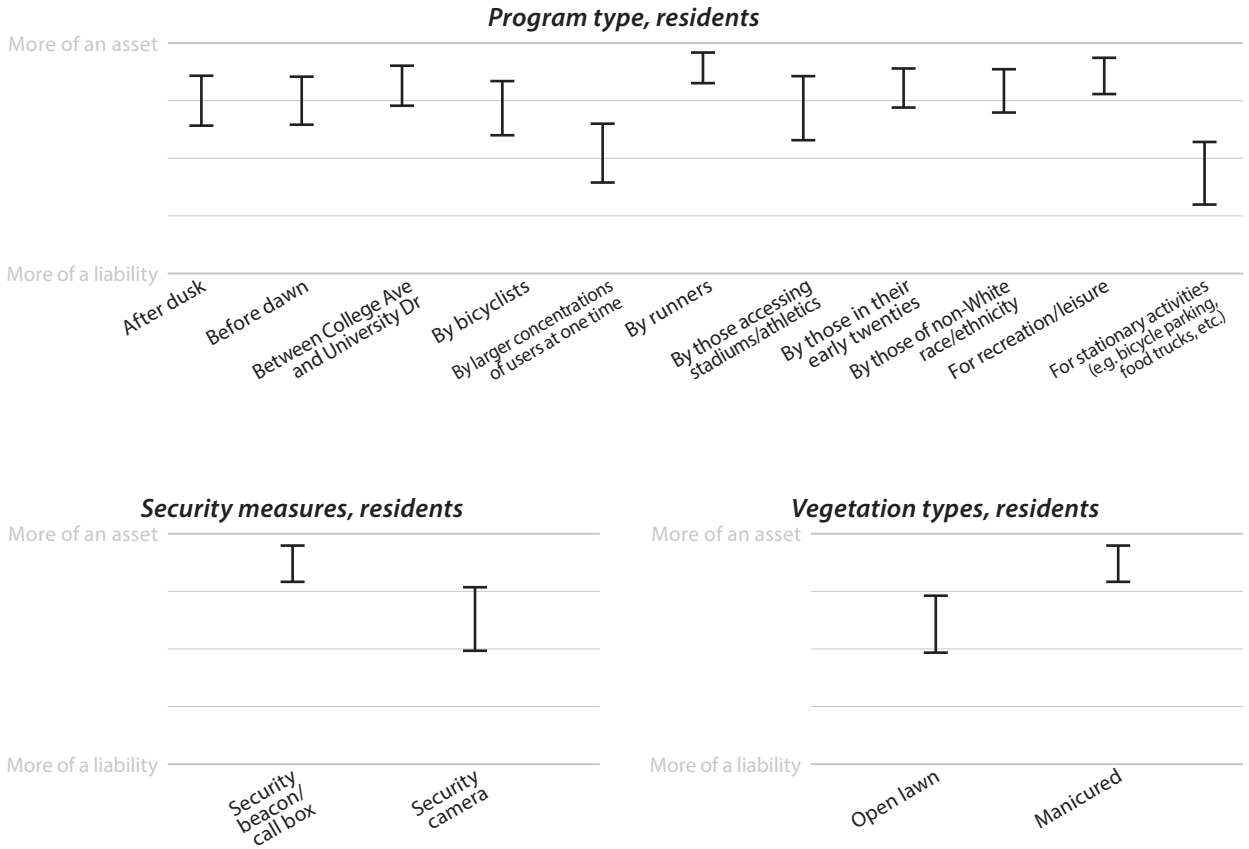
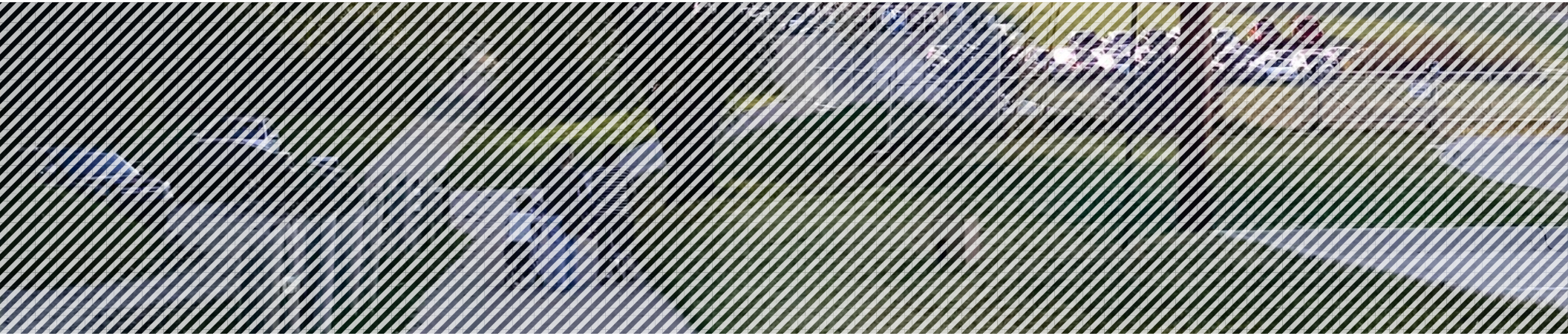


Figure 4.26 Stakeholder survey confidence intervals for residents, measured at 95% confidence

V

DESIGN ALTERNATIVES

OVERVIEW | MINIMAL INTERVENTION | LOW INTERVENTION | MODERATE INTERVENTION | HIGH INTERVENTION | SUMMARY | RECOMMENDED PHASING



V. DESIGN ALTERNATIVES

"The public is more familiar with bad design than good design. It is, in effect, conditioned to prefer bad design, because that is what it lives with."

— Paul Rand (Creger 2013)

OVERVIEW

The following pages display a series of design schemes which synthesize those findings which are applicable to environmental design. Each scheme takes a different conceptual approach to site modifications. These schemes exist on a spectrum of lower-level to higher-level site intervention. The first design shown here employs a "minimal intervention" approach. In this scheme, only those aspects of the existing site for which modification is absolutely essential for the users were addressed. Although budget was not a focus of this study, the minimal intervention scheme also attempts to conceptually limit the cost of implementation time and materials the most of any of the four schemes, based on knowledge of site needs and an understanding of the necessary environmental modifications revealed earlier in the study. Following the minimal intervention scheme are "low," "moderate," and "high" intervention schemes. Each of these schemes also addresses the same modification and generalized budget concepts, but in a way that reflected its title (for example, "high intervention" implies that the design scheme possesses the most intensive combination of modifications of the four schemes given in this chapter). At the end of this chapter, recommendations for pursing all levels of intervention through a phasing strategy are given.

All lighting heights and spacing are calculated based on bulb specifications given in Hinkley Lighting, Inc.'s landscape lighting catalog (2016, pp. 78-81; see Figure 7.31). Lighting in all renderings is displayed solely to provide an understanding of lighting form, and should not be viewed as an accurate reflection of lighting intensity or fixture form. See the Lighting Notes appendix for more detail.

On the following pages, plans are accompanied by legends and call-outs, which identify which research method(s), as sources, generated the proposed modifications and, in the Recommended Phasing section, other interventions.

Figure 5.01 Vignette showing proposed uplighting in Tunnel in Design Alternative A

Figure 5.02 Vignette showing proposed ramp and stairs in Design Alternative A

DESIGN ALTERNATIVE A: MINIMAL INTERVENTION

This design scheme attempts to resolve the major dilemmas of the Trail by focusing on the Tunnel and Low Water Crossing. In the Tunnel, uplighting is proposed as a simple but thorough response to a lack of lighting. To address erosion and ponding in the Low Water Crossing, a ramp and stairs are proposed.

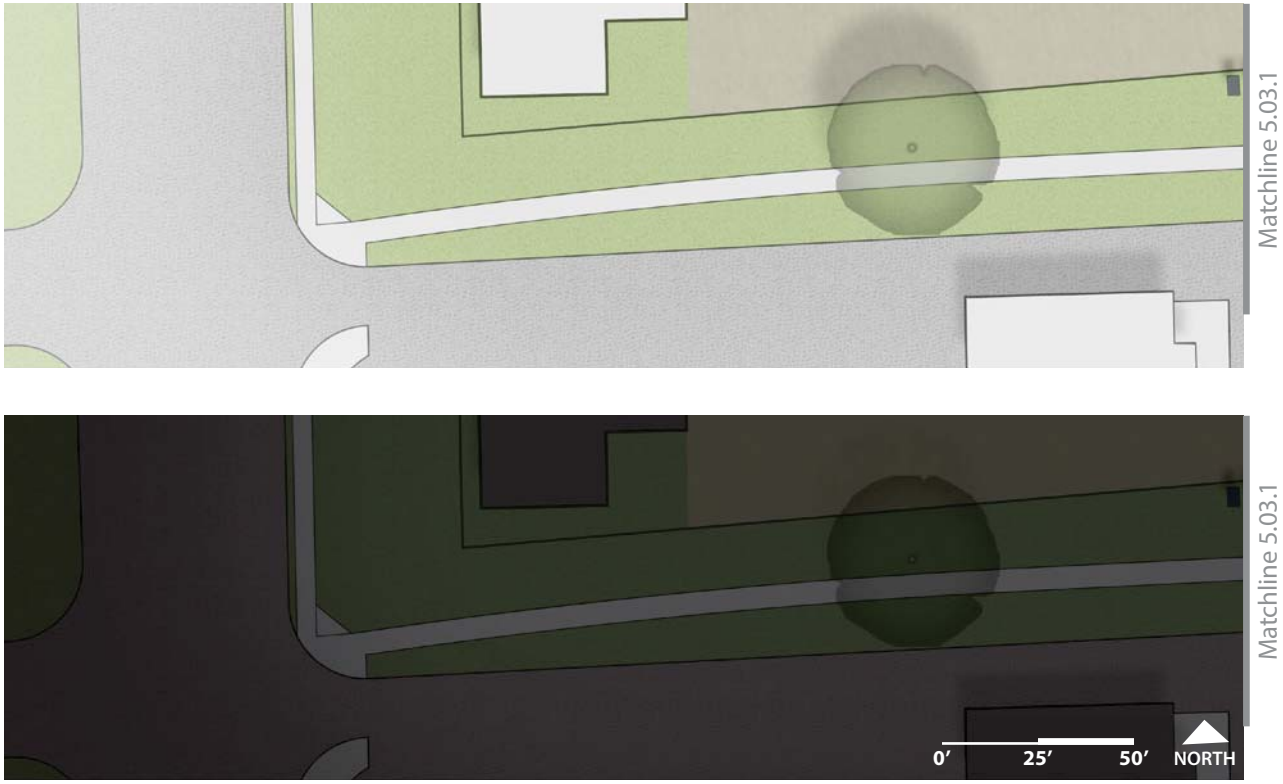


Figure 5.03 Site plans, showing daytime (top) and nighttime (bottom) scenes

DESIGN ALTERNATIVE A: MINIMAL INTERVENTION

LEGEND:

PROPOSED MODIFICATION

Sources:

O&C | *Observation & Correspondence finding*

Dé | *Dérives finding*

IS | *Intercept Survey finding*

SS | *Stakeholder Survey finding*

Design rationale

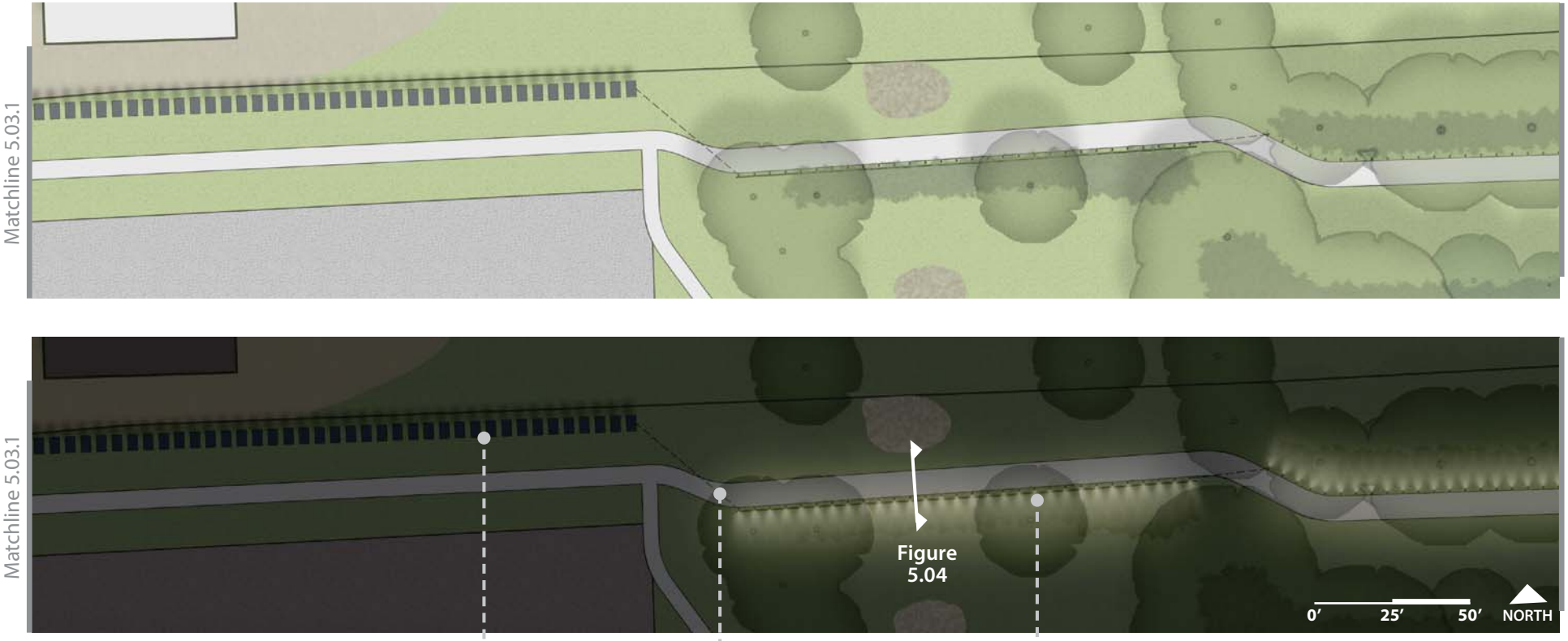


Figure 5.03 Site plans, showing daytime (top) and nighttime (bottom) scenes

SOLAR PANELS

O&C | *Limited electricity infrastructure on site*

Provide electricity on site to decrease site modifications

IN-GROUND COPPER WIRE

O&C | *Copper wire provides high-efficiency electrical transport*

Transport electricity with minimal human and vegetation conflict

UPLIGHTING

O&C | *Tunnel prevents ambient lighting from infiltrating path*

IS | *Viewed as creating relatively safe environments*

SS | *Viewed as a relative asset to stakeholders*

Provide inviting visibility in thickest overgrowth

Figure 5.04 Cross section through the Trail at STA 05+40

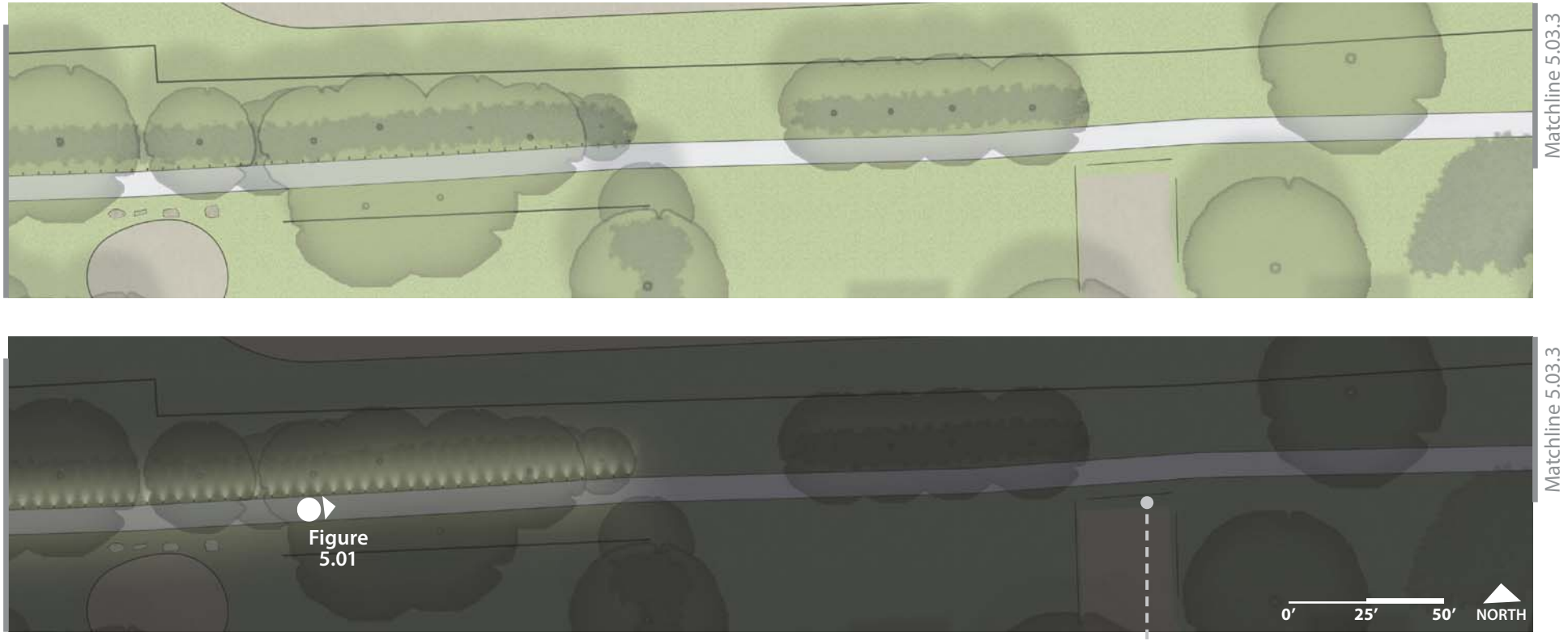


Figure 5.03 Site plans, showing daytime (top) and nighttime (bottom) scenes

REMOVE VEGETATION @ PIPHER

Dé | *Vegetation obstructs infiltration of contextual light to path*

Allow street lights to infiltrate site

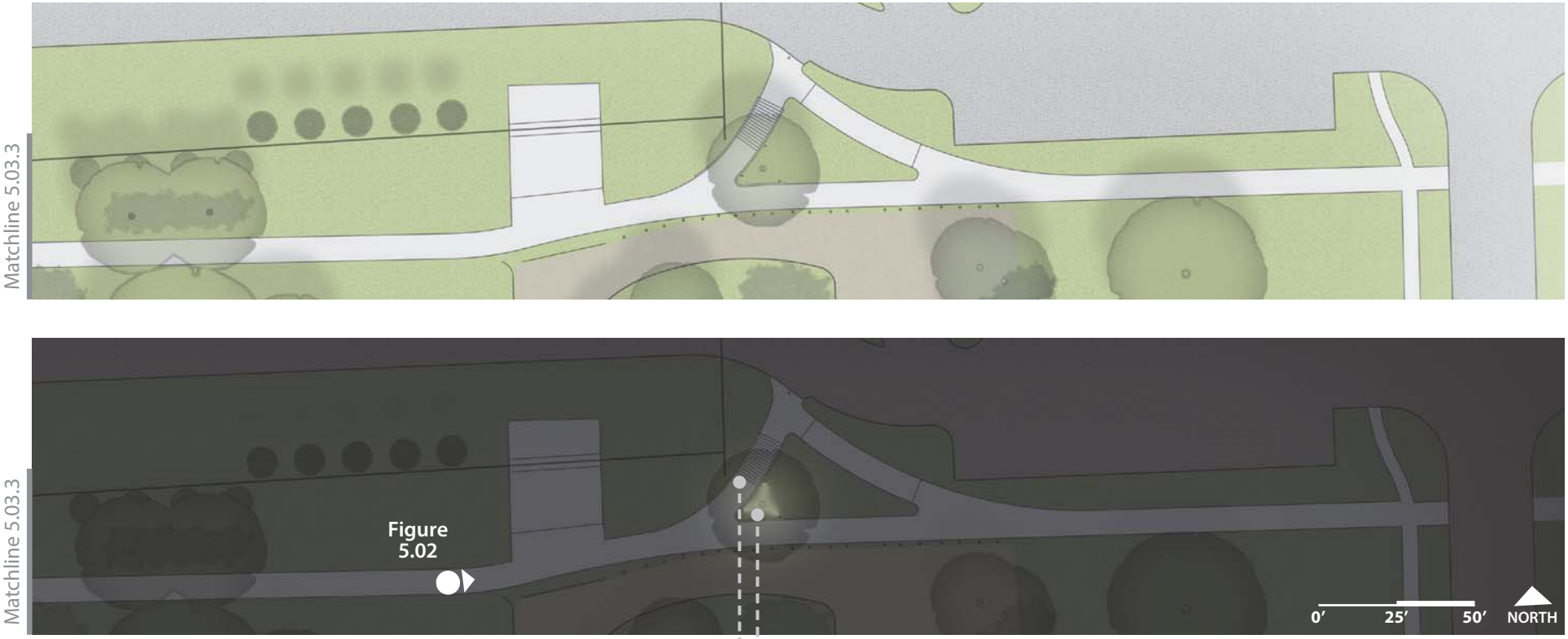


Figure 5.03 Site plans, showing daytime (top) and nighttime (bottom) scenes

ADA-ACCESSIBLE RAMP & STAIR

O&C, IS | *Cow path erodes onto circulation route*

Reduce erosion issues

UPLIGHTING

IS | *Viewed as creating relatively safe environments*

SS | *Viewed as a relative asset to stakeholders*

Provide inviting visibility at new access point to Trail

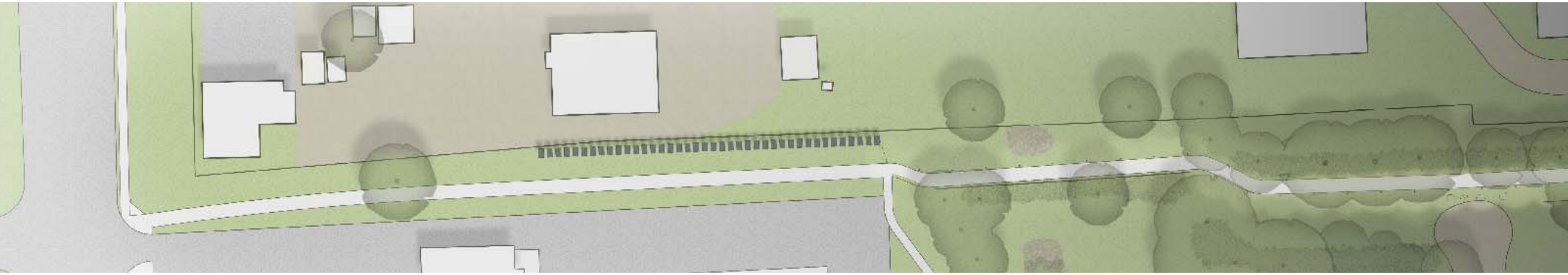


Figure 5.05 Site plans, showing daytime and nighttime scenes (full schematic plans are displayed on the following pages); not to scale

DESIGN ALTERNATIVE B: LOW INTERVENTION

This design scheme attempts to thoroughly resolve the major dilemmas of the Trail. Bollards are used instead of uplighting. Lighting is also added at the College and Hillcrest access points. Vegetation is infilled to create a continuous experience for users.

Figure 5.06 Vignette showing proposed bollard lighting in Tunnel in Design Alternative B

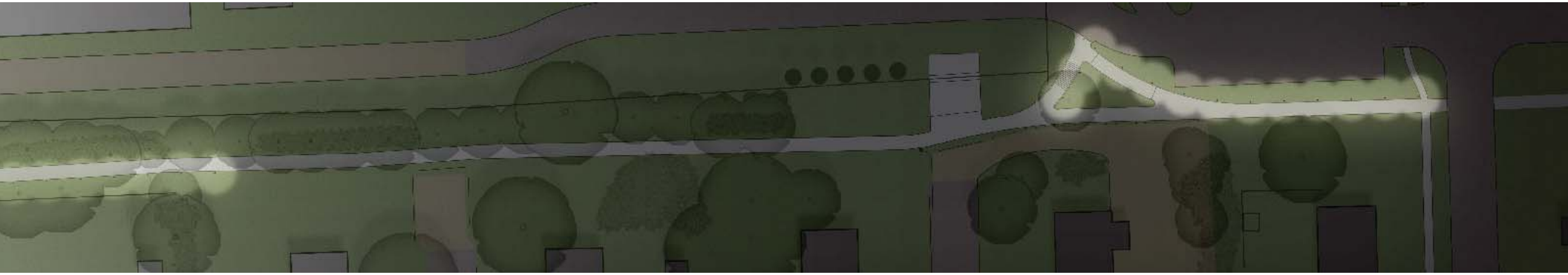


Figure 5.07 Vignette showing proposed ramp and stairs in Design Alternative B

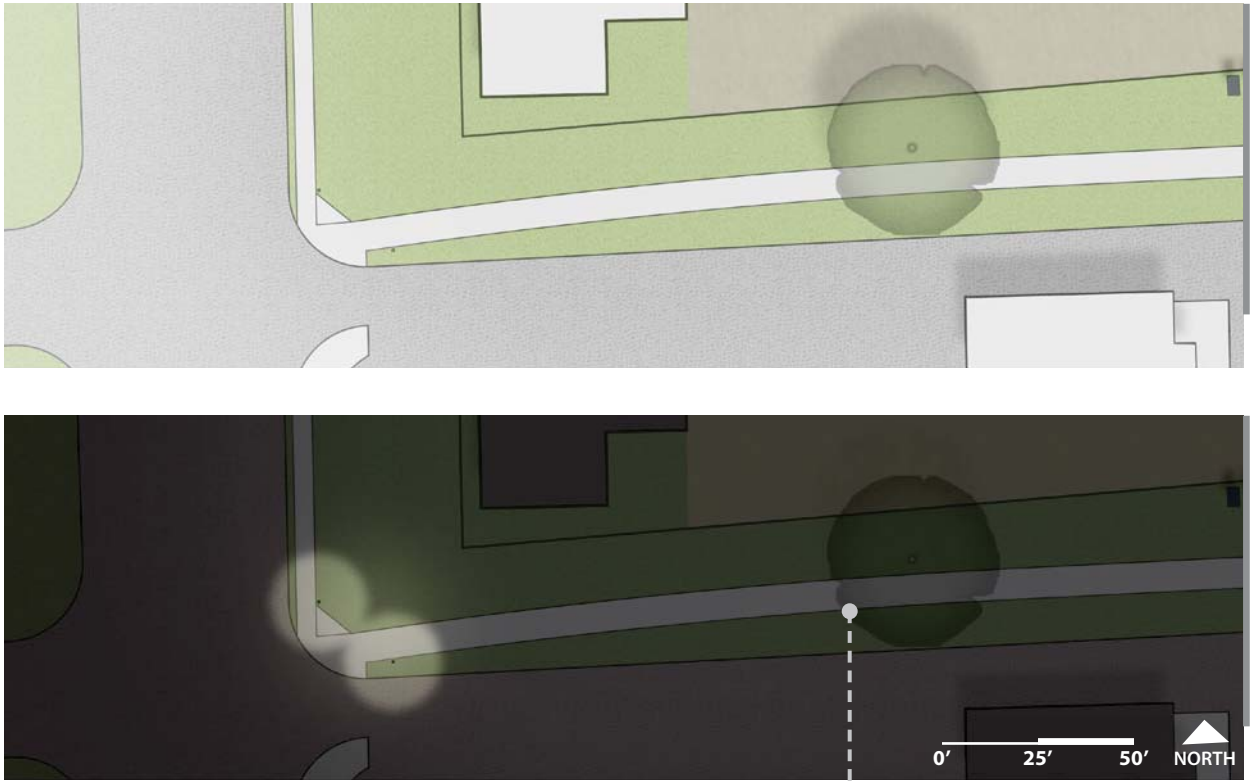


Figure 5.08 Site plans, showing daytime (top) and nighttime (bottom) scenes

DESIGN ALTERNATIVE B: LOW INTERVENTION

LEGEND:

PROPOSED MODIFICATION

Sources:

O&C | *Observation & Correspondence finding*

Dé | *Dérives finding*

IS | *Intercept Survey finding*

SS | *Stakeholder Survey finding*

Design rationale

+/- Pros/cons versus preceding design alternatives

WIDEN UNIVERSITY-OWNED PATH

O&C | *6' is well-below Trail's needs*

O&C | *Path is narrower on University property than on City property*

Allow the same density of traffic to circulate on all portions of path

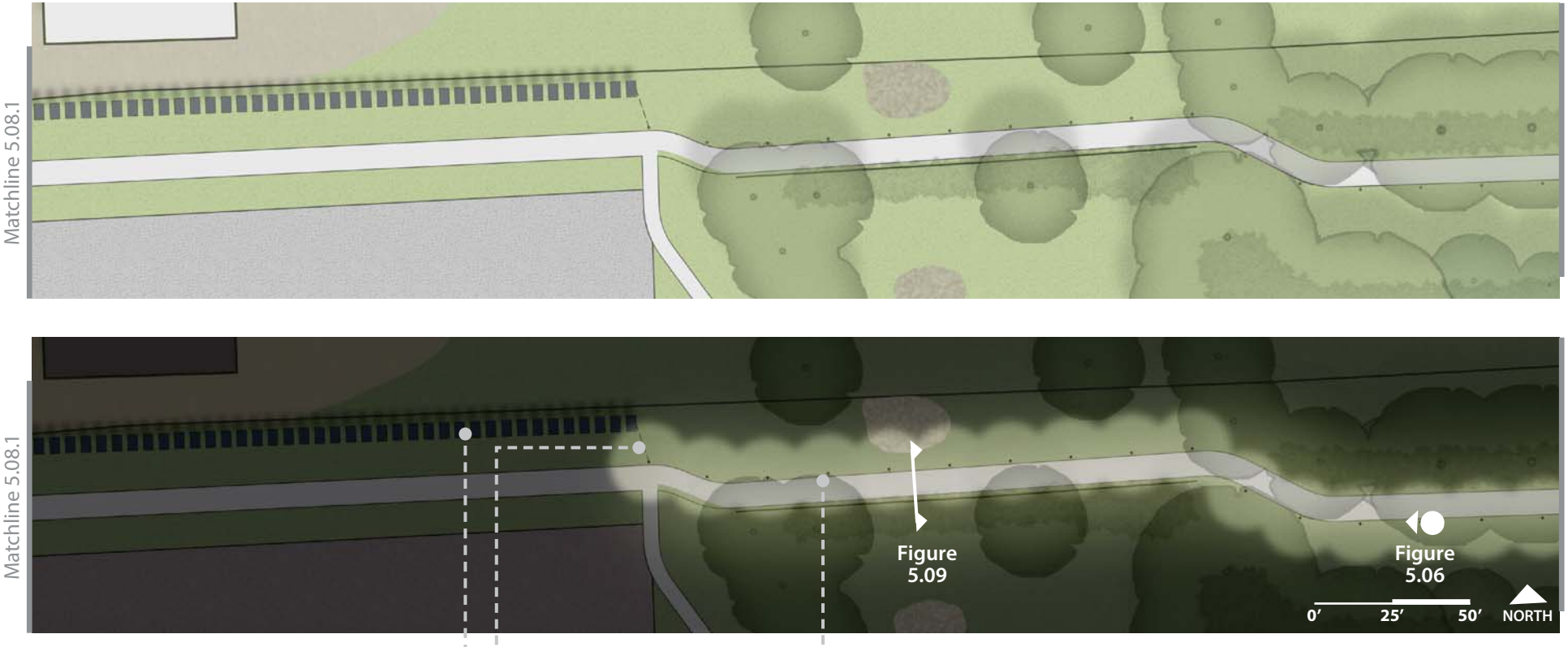


Figure 5.08 Site plans, showing daytime (top) and nighttime (bottom) scenes

SOLAR PANELS

O&C | *Limited electricity infrastructure on site*

Provide electricity on site to decrease site modifications

IN-GROUND COPPER WIRE

O&C | *Copper wire provides high-efficiency electrical transport*

Transport electricity with minimal human and vegetation conflict

BOLLARD LIGHTING

O&C | *Tunnel prevents ambient lighting from infiltrating path*

IS | *Viewed as creating relatively safe environments*

SS | *Viewed as a relative asset to stakeholders*

Provide inviting visibility in thickest overgrowth

+ Higher visibility than Design Alternative A

- Requires more infrastructure than Design Alternative A

Figure 5.09 Cross section through the Trail at STA 05+40

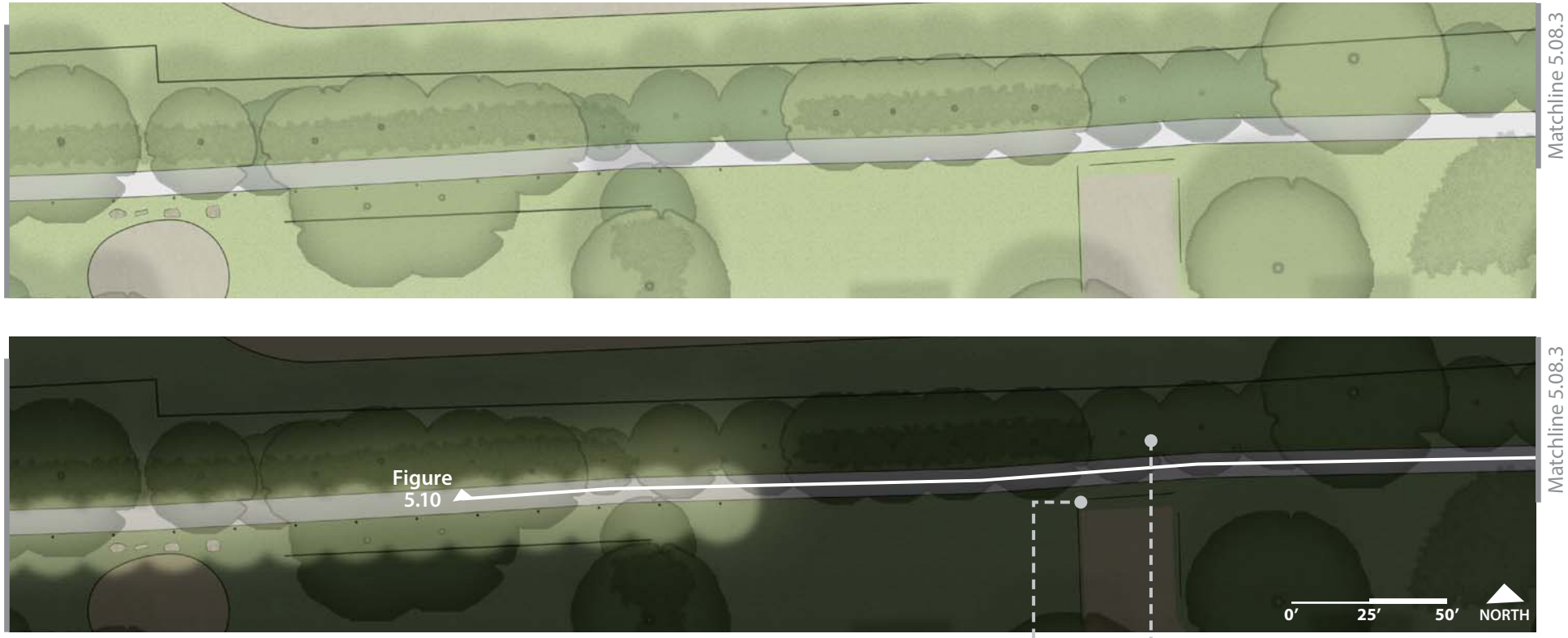


Figure 5.08 Site plans, showing daytime (top) and nighttime (bottom) scenes

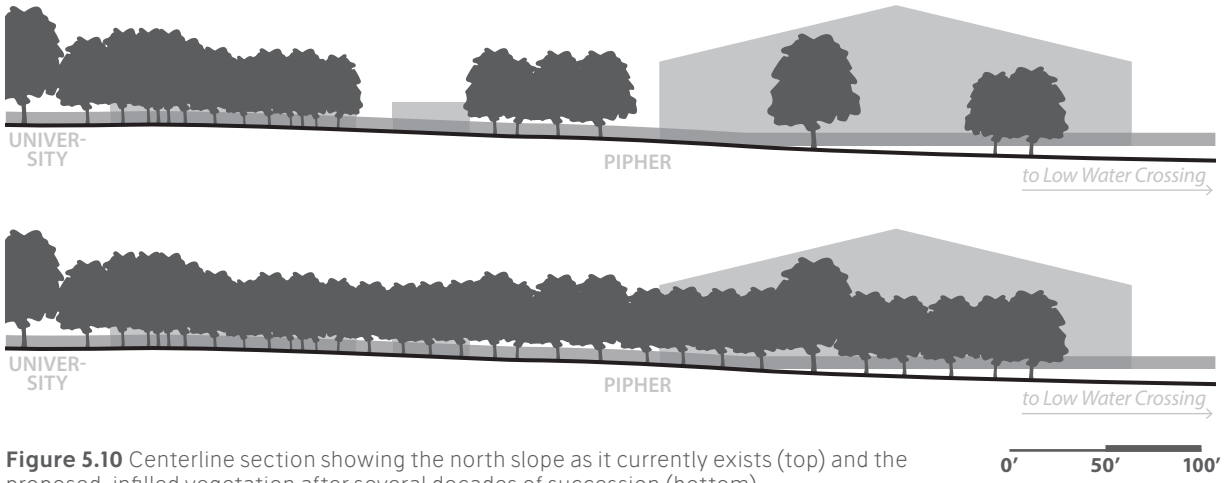


Figure 5.10 Centerline section showing the north slope as it currently exists (top) and the proposed, infilled vegetation after several decades of succession (bottom)

INFILL VEGETATION ON NORTH SLOPE

Dé | *Patchy vegetation creates spatial discontinuity*

Create continuity of spaces without removing mature vegetation

REMOVE VEGETATION @ PIPHER

Dé | *Vegetation obstructs infiltration of contextual light to path*

Allow street lights to infiltrate site

Figure 5.08 Site plans, showing daytime (top) and nighttime (bottom) scenes

INSERT STORM DRAIN AND RE-GRADE SURROUNDINGS MINIMALLY

O&C, IS | *Ponding occurs on path*

Reduce ponding

ADA-ACCESSIBLE RAMP & STAIR

O&C, IS | *Cow path erodes onto circulation route*

Reduce erosion issues

BOLLARD LIGHTING

IS | *Viewed as creating relatively safe environments*

SS | *Viewed as a relative asset to stakeholders*

Provide inviting visibility at new access point to Trail

+ Higher visibility than Design Alternative A

- Requires more infrastructure than Design Alternative A

CONNECTION TO CITY UTILITIES

O&C | *Utility lines enter ground near STA 16+00*

Utilize existing electricity infrastructure where possible

Figure 5.11 Site plans, showing daytime and nighttime scenes (full schematic plans are displayed on the following pages); not to scale

DESIGN ALTERNATIVE C: MODERATE INTERVENTION

This design scheme attempts to address the underlying problems of the Trail rather than treating its symptoms. To respond to visibility issues, a short segment of the Trail is rerouted to provide a wider plane of sight. Entry markers are proposed at both the College and Hillcrest to enhance the image of the Trail.

Figure 5.12 Vignette showing proposed circulation reroute and overhead pole lighting in Tunnel in Design Alternative C

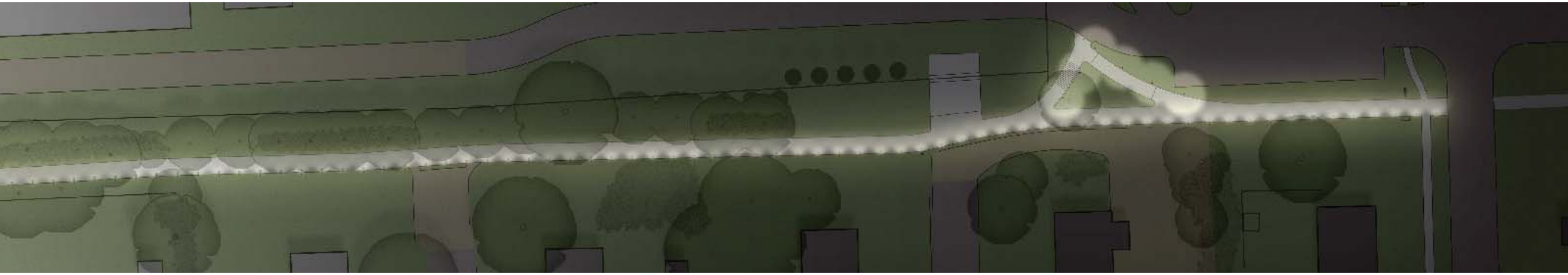


Figure 5.13 Vignette showing proposed ramp and stairs in Design Alternative C

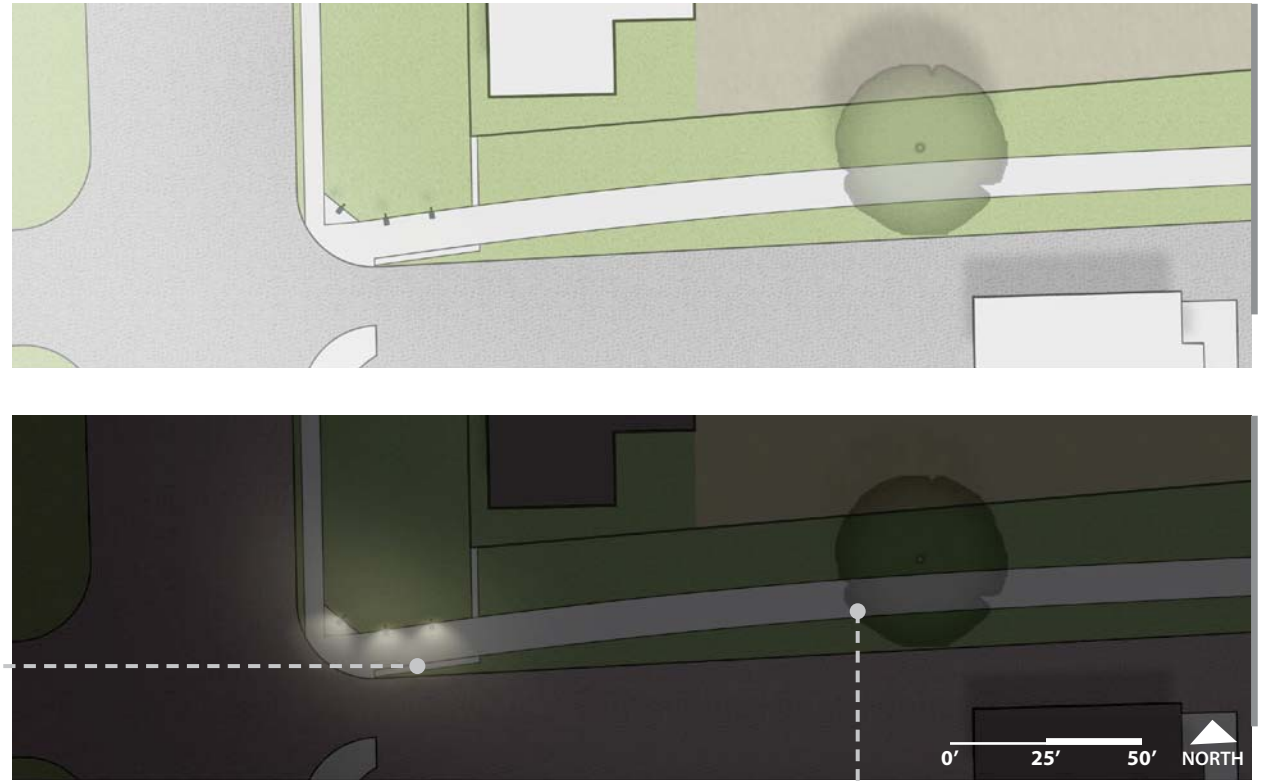


Figure 5.14 Site plans, showing daytime (top) and nighttime (bottom) scenes

DESIGN ALTERNATIVE C: MODERATE INTERVENTION

LEGEND:

PROPOSED MODIFICATION

Sources:

O&C | *Observation & Correspondence finding*

Dé | *Dérives finding*

IS | *Intercept Survey finding*

SS | *Stakeholder Survey finding*

Design rationale

+/- Pros/cons versus preceding design alternatives

HALF WALL

Dé | *Trail lacks spaces to rest*

Dé | *Trail lacks entry wayfinding*

Half wall marks entry while providing informal seating and visibility

WIDEN PATH TO 10' IN ALL LOCATIONS

O&C | *8' is not wide enough for Trail's needs*

Allow bicycles and gators to pass pairs of pedestrians

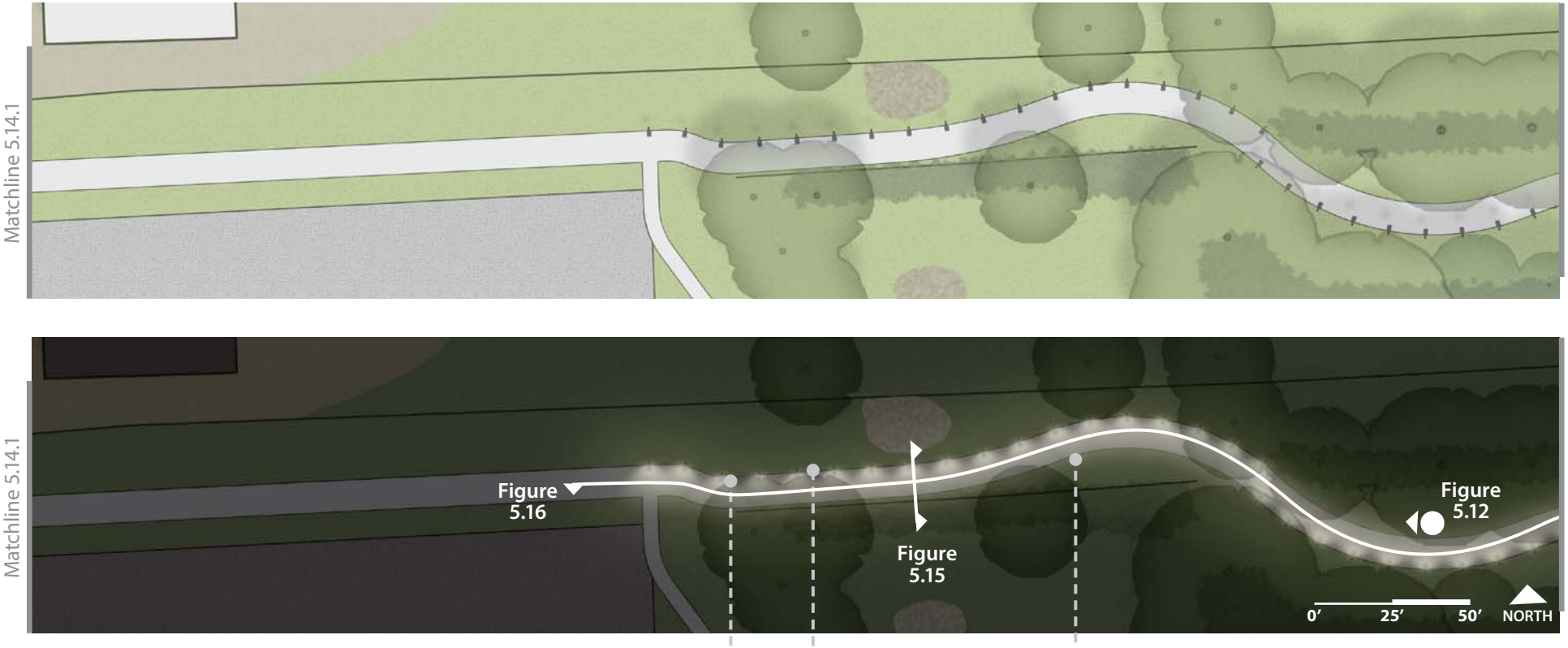


Figure 5.14 Site plans, showing daytime (top) and nighttime (bottom) scenes

INDEPENDENT, SOLAR-POWERED OVERHEAD POLE LIGHTING

O&C | *Limited electricity infrastructure on site*

IS | *Viewed as creating relatively safe environments*

SS | *Viewed as a relative asset to stakeholders*

Provide inviting visibility in thickest overgrowth

+ Fixtures can operate without the need for a larger electricity system, like the one required for Design Alternative B

- Requires more interference with tree branches to capture and project light than Design Alternative B

IN-GROUND FIBER OPTIC CONTROL (OPTIONAL)

O&C | *Mass-produced fiber optic systems transmit digital information quickly*

Allow lighting to be controlled by computerized system

WIDEN CIRCULATION ANGLE NEAR STA 06+00

O&C | *Visibility is poor due to dense vegetation and circulation angle*

Increase visibility without removing mature vegetation

Figure 5.15 Cross section through the Trail at STA 05+40

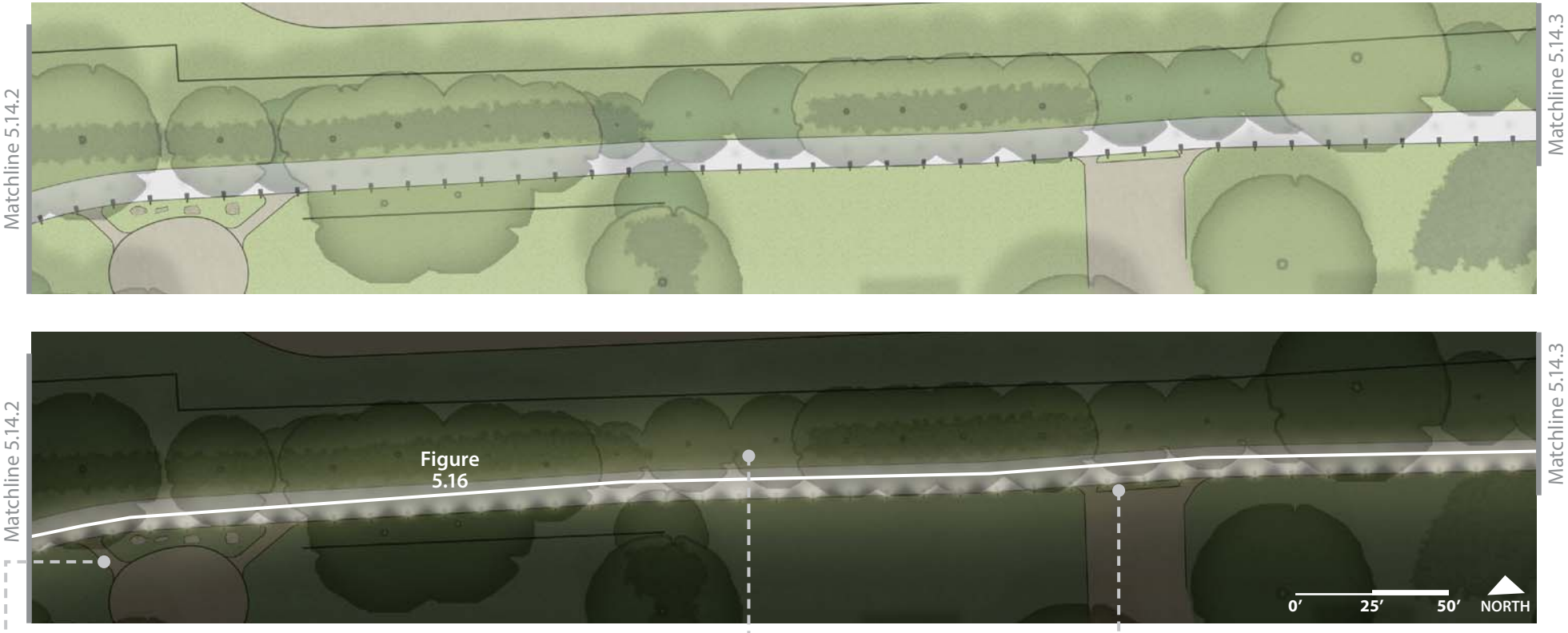


Figure 5.14 Site plans, showing daytime (top) and nighttime (bottom) scenes

RETROFIT ACCESS POINTS USING COMPACTED GRAVEL

O&C | *Cowpaths occur at University and Pipher*

Reduce likelihood of ground surface becoming mud

INFILL VEGETATION ON NORTH SLOPE

Dé | *Patchy vegetation creates spatial discontinuity*

Create continuity of spaces without removing mature vegetation

REMOVE VEGETATION @ PIPHER

Dé | *Vegetation obstructs infiltration of contextual light to path*

Allow street lights to infiltrate site

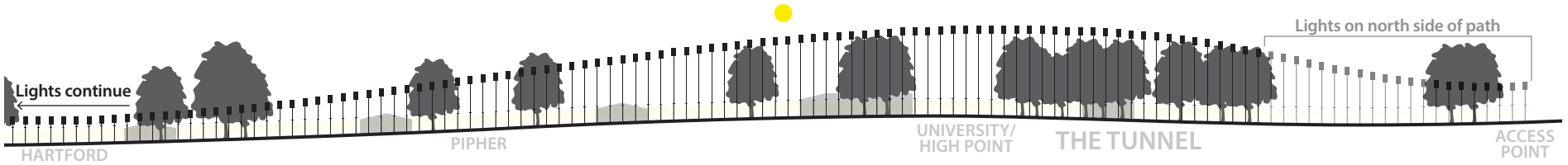


Figure 5.16 Diagrammatic centerline section showing the heights and base elevations of independent, solar-powered overhead pole lighting; facing south

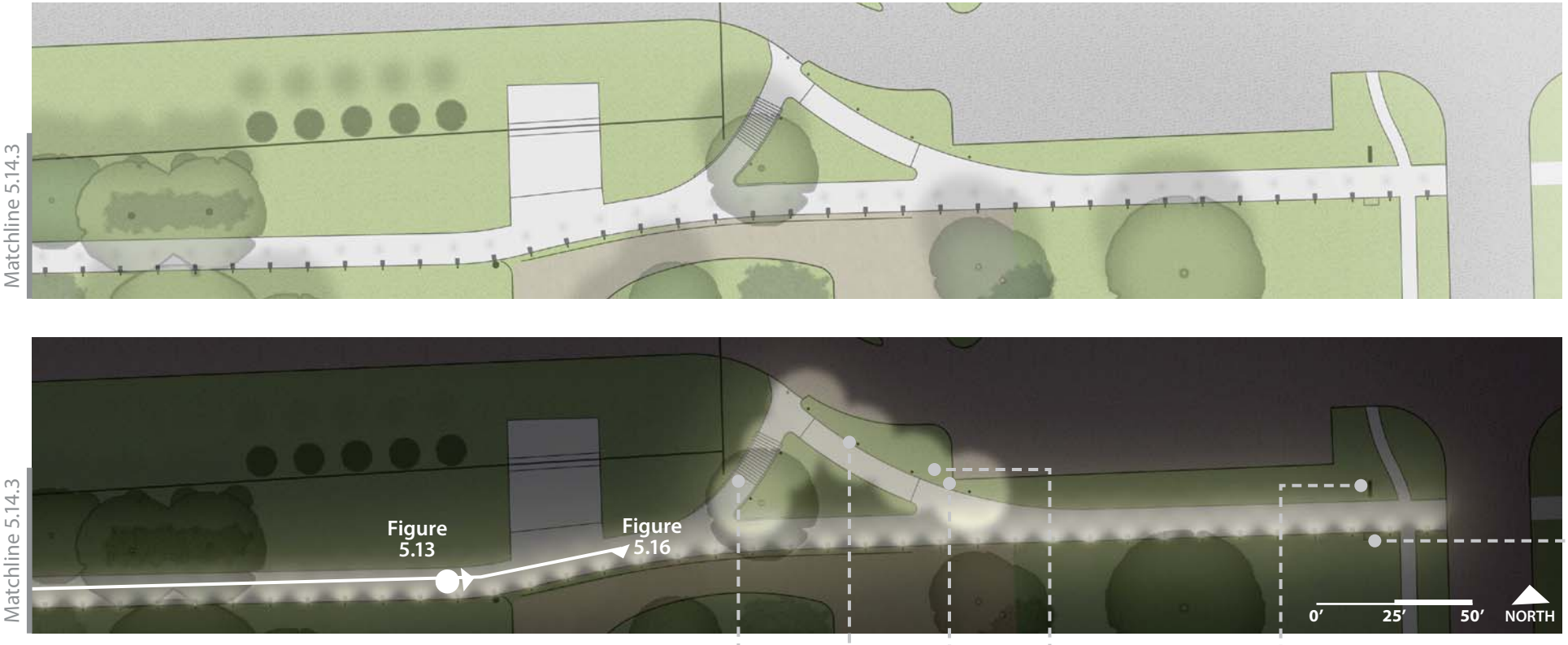


Figure 5.14 Site plans, showing daytime (top) and nighttime (bottom) scenes

ADA-ACCESSIBLE RAMP & STAIR

O&C, IS | *Cow path erodes onto circulation route*

Reduce erosion issues

BOLLARD LIGHTING

IS | *Viewed as creating relatively safe environments*

SS | *Viewed as a relative asset to stakeholders*

Provide inviting visibility at new access point to Trail

+ Higher visibility than Design Alternative A

- Requires more infrastructure than Design Alternative A

IN-GROUND COPPER WIRE

O&C | *Copper wire provides high-efficiency electrical transport*

Transport electricity with minimal human and vegetation conflict

CONNECTION TO CITY UTILITIES

O&C | *Utility lines enter ground near STA 16+00*

Utilize existing electricity infrastructure where possible

SIMPLIFY SIGNAGE

O&C | *Visual clutter at Hillcrest intersection ineffectively communicates information to users*

Simplify existing information to single sign

BENCH

Dé | *Trail lacks spaces to rest*

Bench provides seating in a highly visible location

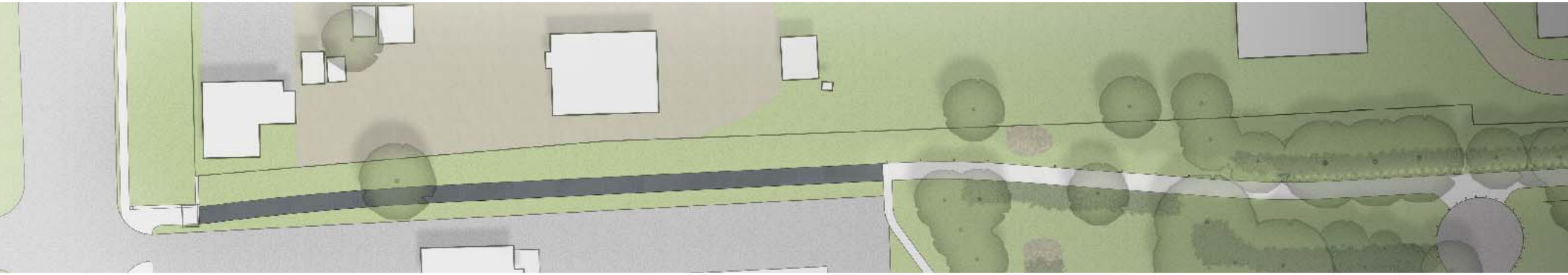


Figure 5.17 Site plans, showing daytime and nighttime scenes (full schematic plans are displayed on the following pages); not to scale

DESIGN ALTERNATIVE D: HIGH INTERVENTION

This scheme attempts to resolve the Trail's problems in the most thorough and unique manner of the four. A constant datum of light continues from College to Hillcrest. The existing experiences of the Tunnel and Low Water Crossing are avoided by simplifying circulation. A parklet is added to encourage users to interact with nature and one another.

Figure 5.18 Vignette showing proposed half wall and threshold along College Avenue in Design Alternative D

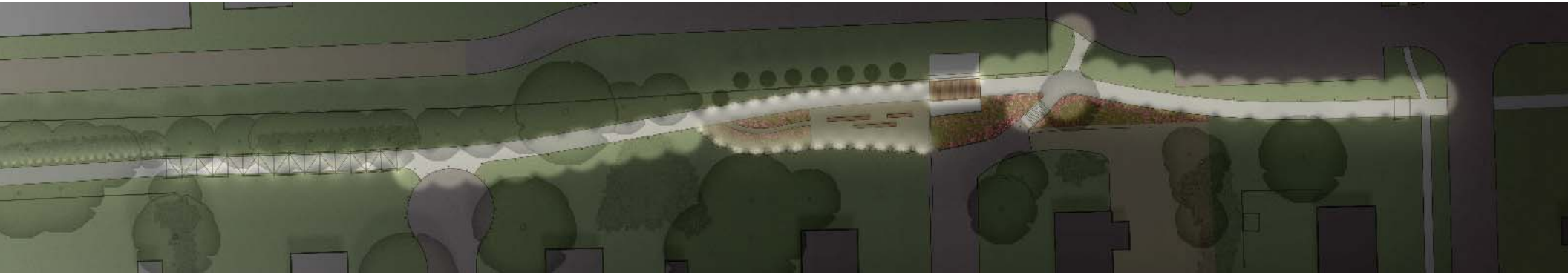


Figure 5.19 Vignette showing solar paving with integrated lighting in Design Alternative D

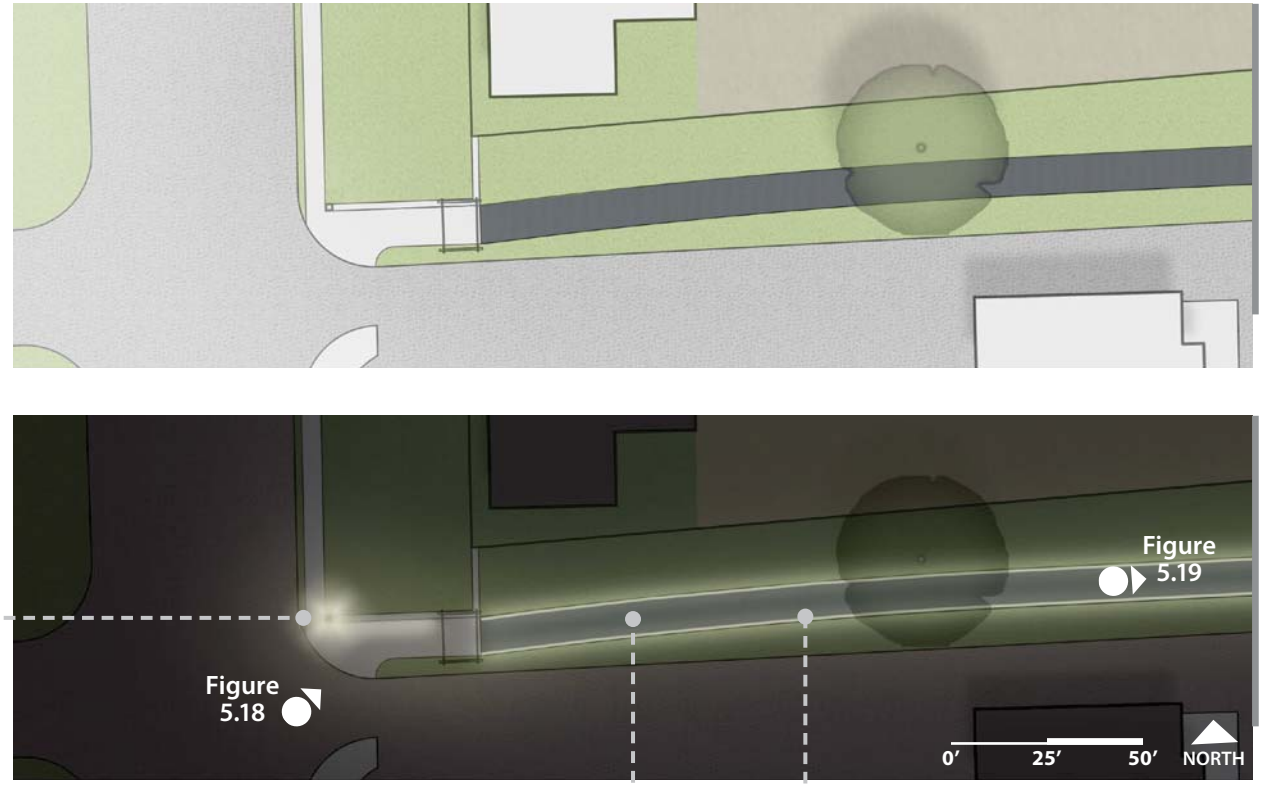


Figure 5.20 Site plans, showing daytime (top) and nighttime (bottom) scenes

DESIGN ALTERNATIVE D: HIGH INTERVENTION

LEGEND:

PROPOSED MODIFICATION

Sources:

O&C | *Observation & Correspondence finding*

Dé | *Dérives finding*

IS | *Intercept Survey finding*

SS | *Stakeholder Survey finding*

Design rationale

+/- Pros/cons versus preceding design alternatives

HALF WALL, W/ LANTERN AND GATEWAY

Dé | *Trail lacks spaces to rest*

Dé | *Trail lacks entry wayfinding*

Dé | *Trail lacks identity pieces*

Half wall iconically marks entry while providing informal seating and visibility

WIDEN PATH TO 10' IN ALL LOCATIONS

O&C | *8' is not wide enough for Trail's needs*

Allow bicycles and gators to pass pairs of pedestrians

SOLAR-GENERATING PAVING, W/ BUILT-IN LIGHTING

O&C | *Limited electricity infrastructure on site*

Generate electricity and increase visibility within the Trail without adding lighting features

+ Illuminate entire site

- Requires replacing existing paving

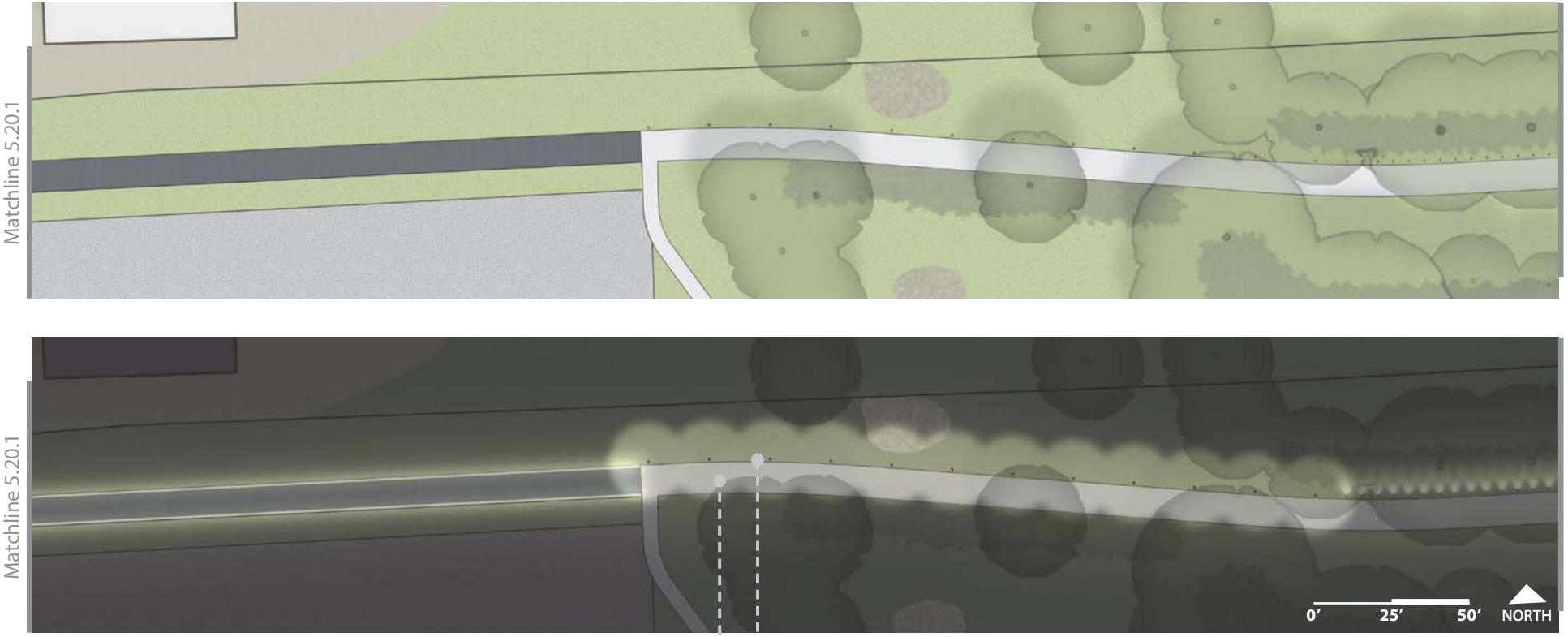


Figure 5.20 Site plans, showing daytime (top) and nighttime (bottom) scenes

REROUTE CIRCULATION FROM STA 04+50 TO STA 07+00

O&C | *Visibility is poor due to dense vegetation and circulation angle*

Increase visibility without removing mature vegetation

+ Simplifies circulation

+ Removing fence along southwest drainage basin reduces the "feeling of being behind something"

- Requires infill of invasive shrubs to appear uniform

BOLLARD LIGHTING

O&C | *Tunnel prevents ambient lighting from infiltrating path*

IS | *Viewed as creating relatively safe environments*

SS | *Viewed as a relative asset to stakeholders*

Provide inviting visibility in thickest overgrowth

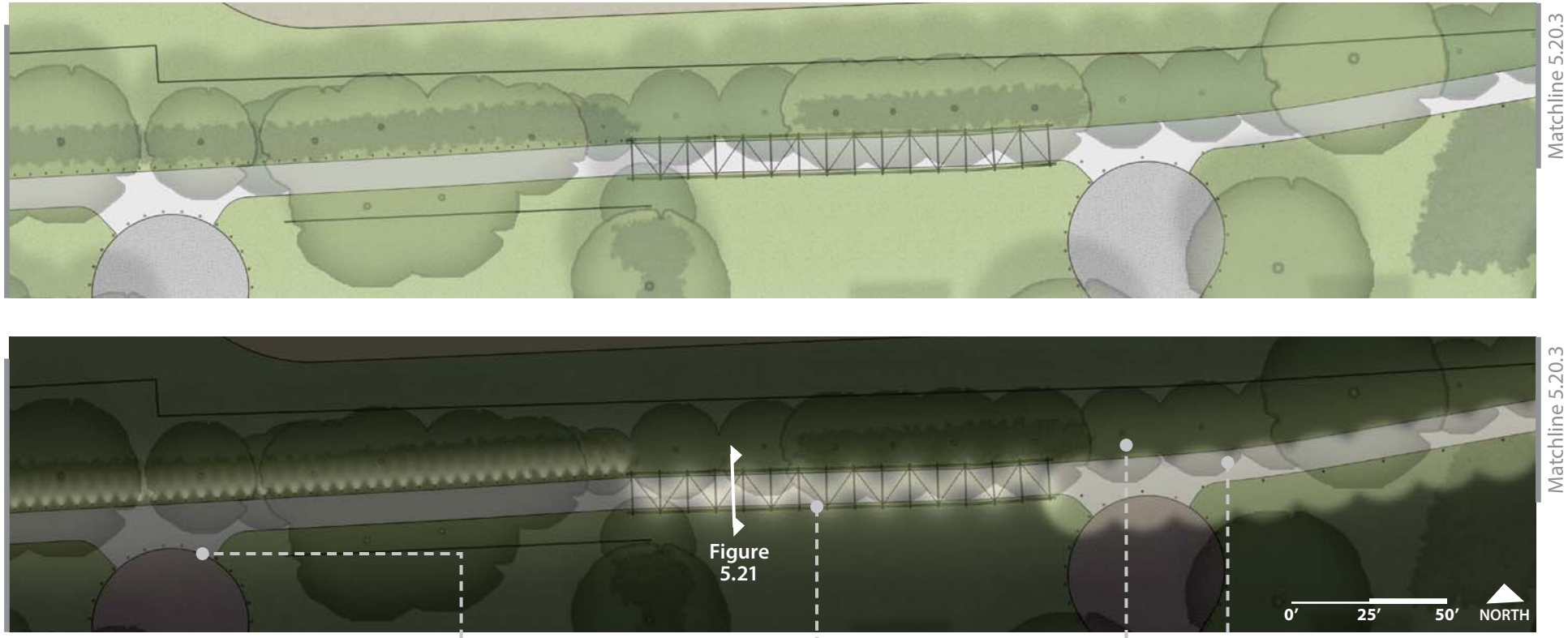


Figure 5.20 Site plans, showing daytime (top) and nighttime (bottom) scenes

RETROFIT ACCESS POINTS USING CONCRETE

O&C | *Cowpaths occur at University and Pipher*

Reduce likelihood of ground surface becoming mud

+ Would make Trail access appear intentional

+ Opportunity to enlarge turn radii on streets

- Would require replacement of existing street pavement and bollards/guardrails

PERGOLA, W/ FESTOON LIGHTING

Dé | *Spatial discontinuity exists where Trail is exposed to open backyard at 1541 Pipher*

Dé | *Trail lacks identity pieces*

Continue spatial enclosure and lighting datums from nearby spaces in an visually iconic way

INFILL VEGETATION ON NORTH SLOPE

Dé | *Patchy vegetation creates spatial discontinuity*

Create continuity of spaces without removing mature vegetation

REROUTE CIRCULATION FROM STA 09+00 TO STA 16+00

O&C, IS | *Cow path erodes onto circulation route*

Reduce erosion issues

+ Avoid circulation through Low Water Crossing altogether

+ Can be done in an ADA-accessible manner without major regrading of north slope

- Would require removal of trees behind 1545 Hartford

Figure 5.20 Site plans, showing daytime (top) and nighttime (bottom) scenes

SLOPESIDE PARKLET

O&C | *Junction of Hartford, the Trail, and Jardine is highly frequented and highly visible*

O&C | *Some families with young children enter trail from Campus Acres and Jardine Apartments*

O&C | *100-year flood overflow is already utilized for stationary skateboarding activity*

Dé | *Trail lacks spaces to rest*

Dé | *Trail lacks identity pieces*

Dé | *Grassy slope is currently unutilized*

IS | *Manicured vegetation is viewed as creating relatively safe environments*

SS | *Manicured vegetation is viewed as a relative asset to stakeholders*

SS | *Increasing recreation and leisure is somewhat viewed as a relative asset to stakeholders*

Increase Trail's value using nature-like environment

+ Logs and boulders can be used as informal seating, especially for parents supervising children

+ Logs, sand, and butterfly plantings may be inviting to families with young children

+ Base of concrete overflow can be transformed into a bioswale

- May encourage stationary activities that are unwanted by stakeholders

INDEPENDENT, SOLAR-POWERED OVERHEAD POLE LIGHTING

IS | *Viewed as creating relatively safe environments*

SS | *Viewed as a relative asset to stakeholders*

Provide inviting visibility in proposed parklet area

SIMPLIFY SIGNAGE USING GATEWAY

O&C | *Visual clutter at Hillcrest intersection ineffectively communicates information to users*

Simplify existing information to single sign

Reduce the amount of time required to read signage

Figure 5.21 Cross section through the proposed pergola in Design Alternative D

Figure 5.22 Vignette showing proposed parklet in Design Alternative D

Figure 5.22 Vignette showing proposed parklet in Design Alternative D

SUMMARY

After substantial completion of renderings, the design alternatives were presented visually and orally to stakeholders, members of the public, and the academic advisory committee. About twenty people were in attendance for this 30-minute presentation and discussion. Based on the feedback given by those in attendance, it became apparent that there was no clearly-preferred alternative among these for the City and other stakeholders to utilize moving forward. While some of the higher-level design interventions were appealing to those in attendance, the consensus was that a higher-level alternative would likely be unachievable in the near future, due to budget constraints. Thus, it was determined that this study should also develop a strategic agenda for phasing which would hypothetically allow stakeholders to achieve interventions from the higher-level alternatives via implementation of lower-level alternatives. Unfortunately, no representatives were in attendance on behalf of the University's planning or property-operating stakeholder parties.

RECOMMENDED PHASING

The following agenda is a recommended strategy for phasing interventions along the Trail. Items which require the most urgent attention, require the least effort to implement, require the least anticipated cost, offer the highest amount of sustainability with minimal effort, and result in the greatest positive impact on user needs are shown sooner in this strategy.

PHASE 1A: ESSENTIAL INTERVENTIONS

Tunnel, southwest basin, and lighting
Uplighting is the most effective lighting solution in this environment (lighting should extend from roughly STA 03+30 to STA 09+50), but if vandalism of lights is a prevalent fear among stakeholders, very strategic excavation for lighting bollards can be conducted. Power this system using solar panels near the south fence of the Marlatt barn. Connect the solar panels in one continuous circuit of copper wire, which can be buried or strung from trees.

Storm drain at Low Water Crossing
Insert drain at location shown in Figure 5.07. Re-grade surroundings just enough for water to enter the drain.

Figure 5.23 Simple signage for bicyclists and pedestrians in Seattle; these wayfinding elements utilize icons, minimal text, and colors to quickly communicate their messages (SDOT 2011, Viriyincy 2009)

PHASE 1B: BASIC INTERVENTIONS

Vegetation at Pipher
This is a relatively simple and quick action. Cut down the vegetation around the guardrail, then use a string trimmer periodically to remove suckers soon after they appear.

Simplified signage
Remove all pedestrian and bicycle signage at College and Hillcrest intersections and replace with one simplified and consolidated sign for each intersection. Use concise wording and basic icons to effectively communicate messages to bicyclists and joggers who pass the signs at higher speeds than walkers. Place all content at eye level to bicyclists.

Entry landmarks
Draw attention to the Trail, especially on College, to aid users and passersby with wayfinding (does not necessarily need to include words). Capitalize on the Trail's new identity by reflecting it with appropriate landscape element choices at its access point. This can happen in as simple or as complex format as the stakeholders wish. Simple procedures for executing this phase could capitalize on the landmark which are already on or near the site. For example, the flowering Magnolia tree along College could be uplit or the former Marlatt house could be grazed.

Retrofitted access points
Lay and compact crushed stone on all cow paths except the one coming from Kerr. This will make entering the Trail seem more comfortable and intentional to users. If not lit already, consider lighting these access points in Phase 2.

Street Crossing at College
Install a flashing-yellow or full stoplight at the intersection of College and Dickens. This will allow users to cross without having to wait for vehicular traffic to clear or stop, or worse, to attempt to "beat them out" (Figure 5.26).

Improved maintenance plan
Lay out a plan to remove leaves from the path regularly during the fall and debris and mud after storms. Reach a common understanding among stakeholders as to who maintains which portions of the Trail and when it happens. As for frequency of maintenance, consistency will be the key among each stakeholder party to ensure that the Trail is maintained to a standard which is satisfactory by its users.

Waste management
Add trash cans and pet clean-up bags at the College and Hillcrest intersections to encourage users to clean up after themselves and others. Enlist Landscape Services' help to ensure that trash cans do not overflow during football games.

Figure 5.24 An entry landmark to a pedestrian and bicycle corridor on the University campus

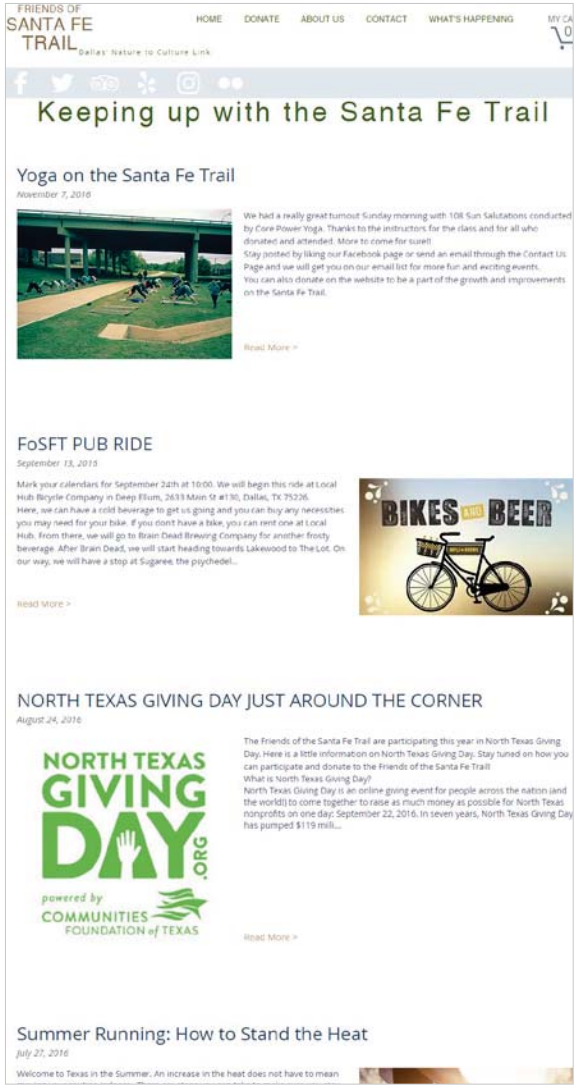


Figure 5.25 FoSFT webpage advertising upcoming events on the Santa Fe Trail (FoSFT 2017)

Figure 5.26 A stoplight-style pedestrian crossing on Denison

Motion Sensors
Install motion sensors along the Trail to conserve electricity used by lighting systems.

Name
Give the trail a sense of identity. Allow the users a name to remember and refer to the Trail by. Use this name consistently between stakeholders, in print media, and on signage. Some recommended names and naming methods for the Trail are provided in the Conclusions chapter.

Friends of the Trail
Establish an independent organization of volunteers who are dedicated to the trail which will care for, promote, and improve it (see also: Santa Fe Trail precedent). This organization could serve as stakeholders' and researchers' go-to body when in need of information or advice about the Trail. Perhaps the Friends' first assignment would be to select a name for the Trail. Throughout the course of this study, a community of several hundred users and stakeholders has expressed its interest in this trail, and several dozen of these subjects appear very passionate about it. These people are current and former residents, everyday joggers, and maintenance workers, among others. If only a few of these already-enthusiastic people unite over this common interest, that could be enough momentum to speed potential interventions and promote potential uses.

PHASE 2: SIGNIFICANT INTERVENTIONS

Essential route modification
The bend which enters the Tunnel should be made much more gradual. This will increase visibility immensely and increase efficiency of bicycle trips through the Trail. Using uplights in Phase 1a will allow lighting elements to be easily moved, if at all necessary. If vegetation needs to be removed, do so only with the vegetation immediately west of the bend, as this vegetation is the least mature in the area.

Widened University path
Widen the path between College and the Tunnel to 10 feet to increase comfort among users.

Ramp and stair
Replace the cowpath coming from Kerr with a permanent, lit staircase and adjacent ramp. See the Low Intervention design alternative for more details. Light also from Hillcrest to Hartford.

Light remaining enclosed areas
From where lighting ends at the Tunnel to the access point on Hartford, light the Trail. This is the last enclosed portion of the Trail to be lit.

Figure 5.27 A parklet beside a sidewalk in San Francisco, complete with informal seating and logs for nature play (Gannon 2013)

Permanent, informal seating
Add seating in the landscape right next to the Trail to allow users to rest and people-watch. Use boulders or large limestone blocks to disguise seating elements as landscaping decor and to simultaneously use them as safety bollards. This seating may be especially popular before and after football games.

PHASE 3: WORTHWHILE INTERVENTIONS

Widened Trail
Widen the remainder of the Trail to 10 to 12 feet.

Lit Trail
Light the remainder of the Trail. Utilize the option to tap into existing City utilities if desired.

North slope vegetation
Plant trees between Pipher and the Tunnel along the north side of the path where lacking in vegetation.

Needs review and correspondence
Review and document the recent needs of the Trail and its users. Unite stakeholders to communicate these needs among each other, along with interests and visions. Cataloging these needs could potentially happen through a possible future study of the Trail, as mentioned in the Introduction & Background chapter.

PHASE 4: OPTIONAL ACTIONS

Low Water Crossing reroute
Reroute the path to avoid the low point altogether. Bridge the concrete overflow with a deck-like structure that provides an overlook of Hartford.

Parklet
Transform the hillside junction into a public parklet, potentially with opportunities for nature play. Replace the lower, flat portion of the concrete overflow with a storm drain and bioswale.

Artistic additions
Implement a pergola with festoon lighting, sculpture, or other decor to enliven the user experience.

Marlatt farmstead
Remove the barbed-wire fence and transform the site into a public environment. Some potential modifications include transforming the house into a museum; the barn into a multi-use, rentable events space (possible precedent: downtown Manhattan's train depot); and the vacant land east of the barn into a dog park. Utilize connections among farmstead stakeholders and garner donations and support from local businesses to unite potential user groups, develop creative programs for the site, and execute interventions. SCP measures should also be taken into consideration.

Figure 5.28 Lit informal seating along a pedestrian and bicycle corridor on the University campus

VI

CONCLUSIONS

CONCLUSIONS | LIMITATIONS OF STUDY | RECOMMENDATIONS FOR FUTURE RESEARCH

VI. CONCLUSIONS

"Where is that trail again?... Oh yeah, I've been there a few times."

— Paraphrased from countless conversations between the Author and his peers

CONCLUSIONS

As a whole, the Trail currently appears to be a well-utilized and enjoyed environment, but one with many drawbacks. The following paragraphs describe the considerations which stakeholders should make when intervening along the Trail, as revealed by this study.

PRIMARY CONCERNS

There are two primary regions of concern: the Tunnel, which needs lighting to encourage safety, and the Low Water Crossing, which needs a storm drain and a paved transition to resolve ponding and erosion issues. The Findings and Design Alternatives chapters describe these regions and recommended approaches in significant detail.

TREATMENT OF EXISTING VEGETATION

Overgrowth is a somewhat polarizing topic in this environment. Some people outspokenly enjoy the opportunity to experience a unique form of nature to the surrounding urban context. However, this vegetation causes a fear of several types of danger for most users: fear of crime and fear of the unknown, non-visible environment which manifests itself at night. This is particularly a concern in the Tunnel. To address the users' and stakeholders' needs effectively, those making modifications to improve visibility and infrastructure must consider both the ecological and experiential effects of their actions.

EFFECTS OF MODIFICATIONS ON USES

The Trail's current conditions foster several primary modes of transportation: walking, jogging, and bicycling. These are used for commute, leisure, exercise, and to access Athletics facilities. When planning interventions to the Trail, stakeholders should be mindful of the specific effects of the proposed modifications on particular uses. Lighting would likely enhance the user experience for all of these uses and likely increase usage frequency. However, there may be drawbacks. For example, implementing manicured vegetation along the Trail may be appealing to residents (presumably because it increases property values), but it may discourage potential users from using the Trail at night due to its possible perception as overgrowth if not properly lit (see Figures 4.25-4.26 and Limitations of Study).

FUNDING FOR INTERVENTIONS

The City Commission approved a City-University fund expenditure to be used for interventions in April 2017 (Hays 2017). Additional funding could come from a variety of sources. Trail interventions could be included in the City's "quality-of-life tax" (see Glossary for overview). Stakeholders could advertise donation opportunities to accelerate interventions. All funding sources could also be commemorated through signage, commemorative bricks, a plaque, or other design details.

NAMING THE TRAIL

A recurring dilemma encountered during correspondence and informal interviews in this study was that the Trail has no official name. This decreased efficiency when communicating with stakeholders, because it led to a need for the author to explain and usually clarify which trail he was referring to. Additionally, when conversing with users and stakeholders, and, outside of the study, when conversing with friends and peers, many of the people the author spoke with were not very familiar with or were entirely unaware of the Trail. Giving the Trail a name would provide the community of users and potential users a common term by which to refer to the Trail and features along it. The following are suggestions for the Trail's name, based on significant discoveries made in this study:

- Campus Acres Trail
- Bluemont College Trail, or Central Trail
- Marlatt Trail, or Farmstead Trail
- The Shelterbelt
- The name of a donor, or something reflecting his or her philanthropic goals
- A name generated in a naming contest open to the public

SPREADING AWARENESS

Discovering the Trail and its improvements could be of particular appeal to potential, occasional, and frequent users alike. The Santa Fe Trail in Dallas is a prime example of this (see the related Precedent Study for more details).

Stakeholders can use the Trail as a promotional tool. For landlords and realtors, this could mean advertising it as a selling point for potential tenants. These stakeholders could also include a brief Trail walk with prospective buyers and tenants when giving tours of their property. For the

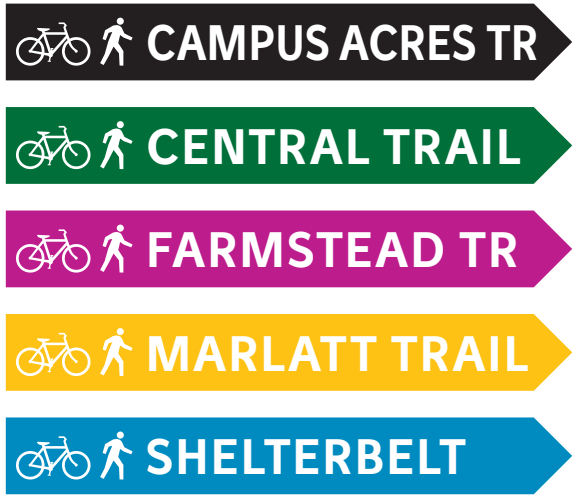


Figure 6.01 Examples of wayfinding signage with icons, direction, and hypothetical names for the Trail

Figure 6.02 Typical wayfinding signage used by the City (left) and prescribed by the University master plan (right); see also: Ayers Saint Gross 2013, MHK 2017

City and University, successful (and unsuccessful) improvements can be looked to as precedents for similar future projects and related master plans.

While assigning a name to the Trail would be a worthwhile intervention, the name must be supplemented with promotion to be successful. The name must be utilized and emphasized. This means reinforcing the name through wayfinding in the form of wordmark signage (Figure 5.18) or through motif-like landscaped spaces and features which allude to this name; for example, if the Trail is named "The Shelterbelt," stakeholders could capitalize on environments like the one shown in Figure 5.10. The name should also be used in wayfinding in surrounding neighborhoods, like the signage shown in Figure 6.02. The name should be commonly utilized among all stakeholders as well as in their publications (for example, City bicycle map, etc.). This study, future research, and other information compiled about the Trail should also be made available and advertised (non-commercially) for the public to be aware of the recreation and circulation opportunities and improvements which have been and will be implemented along the Trail. Promotion of Trail research and improvements could include through University publications, local newspapers and newsletters, and temporary brochure boxes posted at Trail access points. Another method, which would supplement and possibly supersede these methods is word of mouth. To ease and streamline promotion of the Trail, a "Friends of the Trail" organization may be particularly useful. This organization is described in further detail in "Recommended Phasing" in the Design Alternatives chapter.

LIMITATIONS OF STUDY

While a wealth of information exists or can easily be collected about the Trail, much of the information was not relevant to this study. This is primarily due to the practicality limitations which shape the Trail project. First and foremost among these is a potentially limited City budget for the project.

It should also be understood that while the information presented in this study builds from the proven literature on the topic, no design alternative should be considered as "the solution" to the dilemmas posed by the Trail. The design alternatives and phasing recommendations are schematic in nature, and have no proof themselves of being able to have a successful impact on this particular site until systemically tested. Hence, the need for a follow-up study arises, particularly if any aspect of an environment presented in the Design Alternatives chapter is implemented on the Trail site. The opportunity to follow-up on this study should not be taken lightly, as it has the opportunity to become a precedent for future City and University landscape architecture and urban design projects.

There were two significant limitations caused by oversights in the intercept survey. First, the author made a user error while programming the survey, as mentioned in the Methodology chapter. Second, users' understanding of photos appeared to be heavily influenced by perception, as expected. Some participants perceived the image of security cameras to be overhead lighting shown in a daytime setting. Others noticed a large body of water in the far background of the nighttime open lawn image and commented audibly about it. Still others noticed that one of the light bulbs in the bollard lighting photograph was burned out and commented audibly about how it would make them feel less safe. With the exception of the last of these perceptions (this photograph was maintained for uniformity among the surveys), both of these issues were responded to when compiling the stakeholder survey. Captions reading "security beacon/call box" and "security camera" were added to the security features photos, and, for the sake of efficiency among participants, nighttime vegetation scenario photos were not used in the stakeholder survey.

Several intercept survey participants noted that they felt the ethnicities given in the survey were not capable of accurately describing their ethnicity. For example, one student from Africa commented that he would not consider his culture similar to "African-American."

One stakeholder noted in the comments section that several images failed to load on his or her computer. This may have affected his or her responses to the photograph questions.

During photodocumentation, the STA 00+00 photograph facing east was taken at 1/100-second shutter speed and the STA 01+00 and STA 02+00 photos were taken at 1/60-second. This went unrealized until after the methods were completed and photograph metadata was evaluated. However, these mistakes do not have a significant impact on the qualitative results of this or future studies, as the impact is minute and purely visual.

Several plants were incorrectly identified in the site observation notes (these notes can be seen in the Site & User Observation appendix). The information given in the Findings chapter reflects the corrections which have been made to this information.

It is also worth noting that none of the drawings in this document should be used for technical purposes.

RECOMMENDATIONS FOR FUTURE RESEARCH

As previously mentioned, this study also provides a framework for a "post-occupancy" (POE)-style evaluation. Given in the appendices is a summation of the raw data compiled through the duration of this study. With the exception of individual survey responses, which are protected by IRB rights, the entirety of the raw data can also easily be made available to future research in electronic format to aid in future studies.

Future researchers may also consider the relationship between the Trail and contextual cultural influences. How will the increasingly more nighttime-based economy, when coupled with design improvements, transform the way the Trail is used in 5, 20, or 100 years from now? Other factors which may influence this question include:

- The increasing urbanism of Manhattan
- Student body growth of the University
- An ongoing consistency of Athletics capital-improvement projects
- The preservation, repurposing, stagnancy, or neglect of the Marlatt farmstead
- Potential use of the Trail as an extension of therapeutic outdoor space for the regional hospital, located at the corner of College and Kimball
- Macro-scale political or economic factors, such as parks and open space funding constraints or oil embargoes (see also: "OPEC Oil Crisis" in the Glossary and "Late 1970s" in the Site History appendix)
- Any attempt to link the Trail spatially to any City or University master plan

All of these things can be researched and documented, but what will truly complete the Trail? This study addresses the lower two levels of Maslow's hierarchy thoroughly, but it only scratches the surface of the users' and stakeholders' sociological needs. Maslow describes the importance of addressing these sociological needs when he explains self-actualization in ***A Theory of Human Motivation***. "Even if all these needs are satisfied, we may still often (if not always) expect that a new discontent and restlessness will soon develop, unless the individual is doing what he is fitted for" (Maslow 1943). What if the trail could offer opportunities for an individual to discover his or her passions and interests in life? What if the Trail could unite communities across disciplines and backgrounds over a common interest? What knowledge would be required to understand how to achieve these things?

In the process of completing this study, these were some of the empathic motivations instilled in the author. The study produced a series of design alternatives from site, user, and stakeholder data. However, the findings are naught if this study is the culmination of the Trail. Action must be taken to fulfill the needs expressed in this study, and if the wealth of connections, documentation, and local interest unearthed by this study is any indication of the prospective future of this Trail, then the possibilities for future action are practically inexhaustive. Whether the momentum of this Trail study is carried forward through academia, construction, activism, or a mixture of these things, it is this future work that will impact thousands of users and stakeholders in a variety of ways in the years to come. This study should be considered a mere call to action.

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Notes:

Unless otherwise noted, all figures and tables were developed solely by the author.

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Figure 5.09 (photograph)

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Figure 5.18 (photograph)

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Figure 5.21 (photograph)

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Figure 7.03 (topography)

Guarneri, Jay. 2017. ***Assorted GIS Data***. Electronic shapefile. City of Manhattan, Kansas (MHK). Accessed March 1.

Figure 7.04 (topography)

Guarneri, Jay. 2017. ***Assorted GIS Data***. Electronic shapefile. City of Manhattan, Kansas (MHK). Accessed March 1.

Figure 7.05 (topography)

Guarneri, Jay. 2017. ***Assorted GIS Data***. Electronic shapefile. City of Manhattan, Kansas (MHK). Accessed March 1.

Figure 7.07

Portrait of Washington Marlatt. n.d. Photograph. KSU Archives.

Figure 7.08

Portrait of Julia Marlatt. n.d. Photograph. KSU Archives.

Figure 7.09

Animal Husbandry Farmhouse / Family Residence of Washington Marlatt. 1936. Photograph. KSU Archives.

Figure 7.11

Aerial Photograph of Manhattan. 1950. Photograph. Riley County Historical Society and Museum.

Figure 7.12

Aerial Photograph of Manhattan. 1962. Photograph. KSU Metadata, Preservation, and Digital Initiatives.

Aerial Photograph of Manhattan. 1986. Photograph. MHK Public Works.

Aerial Photograph of Manhattan. 1995. Photograph. MHK Public Works.

Aerial Photograph of Manhattan. 2004. Photograph. MHK Public Works.

Aerial Photograph of Manhattan. 2011. Photograph. MHK Public Works.

Aerial Photograph of Manhattan. 2016. Photograph. MHK Public Works.

Figure 7.13 (DEM)

Guarneri, Jay. 2017. ***Assorted GIS Data***. Electronic shapefile. City of Manhattan, Kansas (MHK). Accessed March 1.

Figure 7.14 (aerial)

Guarneri, Jay. 2017. ***Assorted GIS Data***. Electronic shapefile. City of Manhattan, Kansas (MHK). Accessed March 1.

Figure 7.15 (shapefiles)

Guarneri, Jay. 2017. ***Assorted GIS Data***. Electronic shapefile. City of Manhattan, Kansas (MHK). Accessed March 1.

Figure 7.16 (shapefiles)

Guarneri, Jay. 2017. ***Assorted GIS Data***. Electronic shapefile. City of Manhattan, Kansas (MHK). Accessed March 1.

Figure 7.17 (shapefiles)

Guarneri, Jay. 2017. ***Assorted GIS Data***. Electronic shapefile. City of Manhattan, Kansas (MHK). Accessed March 1.

Figure 7.18 (elicitation photos)

bradleypjohnson. 2011. 277/365: ***Uplit***. Photo. https://www.flickr.com/photos/bradleypjohnson/6275444824/.

Good Free Photos. n.d. ***Path to the Lake at Night (7/43)***. https://www.goodfreephotos.com/united-states/wisconsin/newport-state-park/path-to-the-lake-at-night.jpg.php.

Figure 7.18 (elicitation photos)

Jordiferrer. 2007. *English: Sidewalk and Pavement or Path Lighting in Zhuhai, Guandong Province, China*. Own work. https://commons.wikimedia.org/wiki/File:Pavement_lighting_in_Zhuhai.JPG.

Peter. 2017. *Path up Primrose Hill*. Accessed April 30. http://www.geograph.org.uk/photo/1403946.

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Raymond, Nicolas. 2011. *Belfast Botanic Gardens - HDR*. Photo. https://www.flickr.com/photos/82955120@N05/7995406469/.

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Wilson, Blake. 2017. *Photographs Taken for College-Hillcrest Trail Surveys*. Photographs.

Figure 7.23 (select images)

Qualtrics, LLC (Qualtrics). 2017. *Qualtrics Survey Software*. Google Chrome. Provo, UT: Qualtrics, LLC. Accessed April 29.https://kstate.qualtrics.com/ControlPanel/.

Figure 7.24 (elicitation photos)

bradleypjohnson. 2011. 277/365: *Uplit*. Photo. https://www.flickr.com/photos/bradleypjohnson/6275444824/.

Good Free Photos. n.d. *Path to the Lake at Night (7/43)*. https://www.goodfreephotos.com/united-states/wisconsin/newport-state-park/path-to-the-lake-at-night.jpg.php.

Peter. 2017. *Path up Primrose Hill*. Accessed April 30. http://www.geograph.org.uk/photo/1403946.

Pexels. 2017. *Free Stock Photo of Bokeh, Idea, Light Bulb*. Accessed April 30. https://www.pexels.com/photo/lights-bokeh-rope-light-window-41113/.

Raymond, Nicolas. 2011. *Belfast Botanic Gardens - HDR*. Photo. https://www.flickr.com/photos/82955120@N05/7995406469/.

WDNet Studio. 2017. *The World's Best Photos of Securityservices - Flickr Hive Mind*. Accessed April 30. https://hiveminer.com/Tags/securityservices/Interesting.

Wilson, Blake. 2017. *Photographs Taken for College-Hillcrest Trail Surveys*. Photographs.

Figure 7.30 (photometrics)

Hinkley Lighting, Inc. 2016. *Hinkley Landscape Catalog 2016*. Avon Lake, OH. http://www.hinkleylighting.com/dynamic/idea_center.aspx?cat=catalog.

Figure 7.31

Hinkley Lighting, Inc. 2016. *Hinkley Landscape Catalog 2016*. Avon Lake, OH. http://www.hinkleylighting.com/dynamic/idea_center.aspx?cat=catalog.

APPENDIX A: GLOSSARY

Note: Glossary entries which cite a source may be paraphrased for the sake of simplifying the definition for the purpose of readability. Cited entries described as "adapted from" indicate that the definition was modified from the cited source to reflect the topics addressed in this study.

A

Access point
A node where users can enter the Trail

Aesthetic
"Relating to sensory perception" (Oxford 2017)

Alternative transportation
Mode(s) of transportation which do not require the user to drive a motorized vehicle

Amenity
A desirable or useful feature or facility of a building or place (Oxford 2017)

Americans with Disabilities Act
A civil rights law, prohibiting discrimination against individuals with any form of disability in all areas of life (ADA National Network 2017)

Aperture
The opening in a camera lens that lets light in (Wilson 2017)

Architecture (discipline)
The art and practice of designing and constructing buildings, interiors, landscapes, and other environments (adapted from Oxford 2017)

Architecture (sub-discipline)
The sub-discipline of architecture which is concerned with the structure of buildings

ArcMap
A widely used brand of GIS software

Area Transportation Agency
See "Flint Hills Area Transportation Agency"

Art
An expression of human creativity reflecting beauty or emotion (Oxford 2017); see also: "design"

Arterial road
A road which provides the highest level of service at the greatest speed for the longest uninterrupted distance; for example, an interstate highway (FHWA 2012)

Arterial street
See "arterial road"

Athletic Department
The official name for "K-State Athletics"

Athletics (capitalized first letter)
See "K-State Athletics"

Attention Restoration Theory
The theory that a person can reduce mental fatigue and increase concentration by spending time in or viewing nature (Kaplan 1995)

AutoCAD
A widely used brand of computer-aided drafting products produced by Autodesk, Inc.

B

Blind Likert scale
A Likert scale which does not display numerical values; in this study, a 0-to-100 slider-style Likert scale was used for several questions on the surveys where the numbers were embedded in the question's metadata, but not displayed to participants, creating a seemingly-infinite range of responses for the user

Bluemont Central College
The first postsecondary educational institution in the region; established immediately southwest of what is now the Trail by Washington Marlatt, among others; Marlatt was its first principal and his eventual wife was its first teacher; later became KSAC, and eventually KSU

Bluemont College
See "Bluemont Central College"

Bottom line
The financial total of an account or budget (Oxford 2017)

Brief (noun)
A set of instructions given to subjects before beginning a survey (Oxford 2017)

Brief (verb)
The act of distributing a brief

Bungalow
A low house having only one or two stories (Oxford 2017); the primary housing form in the neighborhood immediately south and southeast of the Trail

Bureau of Land Management
A federal government agency which administers public lands

C

Campus Planner
The landscape architect employed by the University to conduct design and project coordination in conjunction with Landscape Services

Capital improvement
An infrastructural or other architectural improvement which is completed using financial revenue of its stakeholders (adapted from Oxford 2017)

Centerline
An imaginary line which marks the center of a corridor; useful for marking station points

Centerline section
A section which is taken parallel to circulation, along the centerline

Circulate
To move continuously or freely through a space (adapted from Oxford 2017)

Circulation
A measure of the way in which a specific user or group of users circulates

Civil engineering
The discipline of engineering that addresses infrastructure

City of Manhattan
See "the City"

City, the
The governing body of Manhattan, Kansas and all its subsidiaries

Collector road
A road which provides a level of service not offered by arterial or local roads in order to provide a physical connection between the two (FHWA 2012)

Collector street
See "collector road"

College (capitalized first letter)
See "College Avenue"

College Avenue
A collector street immediately west of the Trail; provides the Trail with one access point; see Figure 1.01 for a map of its location

College-Hillcrest Trail
The unofficial name for the Trail used solely by this study, functionalizing its nomenclature in instances where an actual name is necessary (for example, survey headers and correspondence); the purpose of this name to avoid misconceptions about ownership, management, and location of the study site caused by other names currently in use for the Trail by stakeholders and mapping services (see also: "Jardine Trail" and "K-State Perimeter Loop"); the Trail does not currently have a name widely recognized by most users

Collegiate Villa
See "Collegiate Villa Apartments"

Collegiate Villa Apartments
An apartment complex located immediately southwest of the Trail

Collegiate Villa Condominiums
A former name of the Collegiate Villa Apartments, displayed on a physical sign along College Avenue; during pre-stakeholder survey correspondence, it was discovered that several of these condominiums still remain

Computer-aided drafting
A software for drawing and manipulating architectural plans, sections, and elevations

Confidence interval
A range of values that characterize the results of a survey, and can be used to explain, with a given amount of confidence ("confidence level") a finding in the given set of data (adapted from Oxford 2017)

Confidence level
The probability that a value falls within a given range ("confidence interval") in quantitative data analysis (Oxford 2017)

Connection
A relationship in which a person or thing is linked or associated with someone or something else (Oxford 2017); in this study, the term typically refers to linkages between two spaces or between a space and its program

Corridor
A segment of a path which has edges which encourage circulation through space rather than stoppage

Cross section
A section which is taken perpendicularly to circulation

D

Dark sky (common noun)
A place where the night sky is relatively free of interference from artificial light (adapted from Oxford 2017); see also: "light pollution"

Dark Sky (proper noun)
See "International Dark-Sky Association"

Datum (design, plural: "data")
"A line, plane, or volume that by its continuity and regularity, serves to gather, measure, and organize a pattern of forms and spaces" (Ching 2007)

Datum (research, plural: "data")
"A piece of information" (Oxford 2017)

Denison
See "Denison Avenue"

Denison Avenue
A north-south street 0.4 miles east of the Trail

Department of Housing and Dining
A self-operated auxiliary department which conducts and maintains standards for business operations, facilities management (separate entity from Division of Facilities), dining services, and resident life for all University-owned apartments and residence halls (KSU 2017)

Department of Landscape Architecture and Regional & Community Planning
The department within the College of Architecture, Planning and Design at Kansas State University that conducts all coursework and handles all curricula related to Landscape Architecture degrees and Regional & Community Planning degrees

Dérive (noun, pronounced "duh-REEVE")
A specific period of uninterrupted time devoted to impulsively exploring an environment through experiential circulation (adapted from Knabb 2017); the term was first coined in a 1958 study conducted by urban researchers in Paris

Dérive (verb, pronounced "duh-REEVE")
To go on dérive

Design (noun)
Composition which exists to resolve a dilemma (adapted from 2017); also, the discipline of designing; see also: "art"

Design (verb)
The act of developing a design

Design alternative
A design scheme which is presented to the City during and upon completion of this study; these schemes are the synthesis of the findings; the term originates from the idea that these schemes are potential options for the City's use which are unique from the City's design

Design element
A landscape or architecture (of buildings) element which may or may not exist within a designed form or space; may be either an element has already been designed or one which has not yet been designed

Designed element
An element which has been designed, as distinguished from those which have not yet been designed

Design needs
The necessary design response to fulfill user or ecological needs

Desire
A strong feeling of wanting to have something or wishing for something to happen (Oxford 2017)

Determinacy
The characteristic of a set of data to provide evidence for drawing a determinate conclusion

Determinate
"Having exact and discernible limits or form" (Oxford 2017)

Diagram
"A simplified drawing showing the appearance, structure, or workings of something; a schematic representation" (Oxford 2017) as opposed to a realistic or technical drawing

Dickens
See "Dickens Avenue"

Dickens Avenue
A street which forms a T-intersection with College, continuing the Trail's right of way to the west of the site

Digital elevation model
A three-dimensional representation of the Earth's surface; in GIS, digital elevation models are typically displayed in two-dimensional plan format using colors to indicate changes in elevation

District
The spatial sum of the paths, edges, nodes, and landmarks of a given area (Lynch 1960)

Dividends
A regularly-paid sum of money paid by a company to its shareholders

Division of Facilities
The University-employed group that plans, budgets, builds, operates, maintains, and supplies all buildings and infrastructure owned by the University (KSU 2017)

Downlighting
Lighting which is cast downwards onto a surface or object; typically this is used below the user's shoulders in landscape environments to avoid light waves traveling toward the human eye

E

Edge (in an environment)
The physical boundary of an environment

Edge (in The Image of the City)
The sum of the peripheral elements of a path (Lynch 1960)

Empirical
Data which is observed or experienced rather than developed by logic (Oxford 2017)

Environment
The surroundings or conditions in which a person or thing operates (Oxford 2017)

Environmental psychology
A branch of psychology concerned with the relationship between users and their environments (adapted from Oxford 2017)

Esteem
The presence of a stable, firmly based evaluation of oneself and those around him or her (Maslow 1943)

Experience
An event or occurrence which leaves an impression on the user (adapted from Oxford 2017)

Experiential design
The discipline of architecture, planning, and other forms of design which focuses on the experience of the user

Exposure (in photography)
The amount of light that enters a camera, based on aperture, ISO and shutter speed (Wilson 2017)

F

f/ (pronounced "F-stop")
Units of aperture light measurement (Wilson 2017)

Facilities (capitalized first letter)
See "Division of Facilities"

Facilities (lowercase first letter)
A place, amenity, or piece of equipment provided for a particular purpose (Oxford 2017)

Facilities Grounds
A defunct branch of Facilities' landscape maintenance efforts which handled all duties in the University campus core (east of Denison); replaced by Landscape Services in 2016 when it was consolidated with Grounds West

Factor analysis
An assessment of the possible causes for a given result within a set of data

Finding
A conclusion which can be drawn as a result of data, whether qualitative or quantitative

Fixture
A piece of equipment which is fixed into place within an environment (adapted from Oxford 2017)

Flint Hills Area Transportation Agency
The public transit agency for greater Manhattan

Focal length
The field of view which a camera lens registers (Wilson 2017)

Foot-candle
The amount of light that one candle produces one foot away from its wick (Oxford 2017)

Form
The shape and structure of a thing or the composition of its elements; does not include substance and material (Ching 2007)

Formal
Of or relating to the form of an object

G

Gator
Universal lexicon for a two-passenger buggy used for maintenance operations; the name originally comes from a specific buggy model produced by John Deere

Geographic Information Systems
A software for analyzing, assessing, manipulating, and storing geographical information on a computer (adapted from Oxford 2017)

Grading
The act of modifying topography

Grazing
A form of uplighting in which the light is directed parallel to a rough surface to accentuate its form (Hinkley Lighting, Inc. 2016, 10)

Green infrastructure
Infrastructure which utilizes nature-like elements

Grounds West
A defunct branch of Facilities' landscape maintenance efforts which handled all duties in the western portions of the University campus; replaced by Landscape Services in 2016 when it was consolidated with Facilities Grounds; this term is also used to refer to the physical facilities (storage and workshops) owned by Landscape Services on the former Marlatt farmstead immediately northwest of the site

Guerrilla urbanism
Tactical urbanism which occurs without warrant and typically without advance public notice

H

Habitat Theory
The idea that users will desire to be in environments based on what seems to be rather than what actually is (Appleton 1975, 68-69)

Hartford
See "Hartford Road"

Hartford Road
A local street immediately south of the Trail; provides the Trail with one access point; see Figure 1.01 for a map of its location

Health
One's physical, mental, and social well-being (Velarde, Fry, and Tveit 2007); good health is the direct result of fulfillment of the needs outlined my Maslow in A Theory of Human Motivation

Hillcrest
See "Hillcrest Drive"

Hillcrest Drive
A local street immediately east of the Trail; provides the Trail with one access point; see Figure 1.01 for a map of its location

Housing (capitalized first letter)
See "Department of Housing and Dining"

Housing and Dining Services
See "Department of Housing and Dining"

Human motivation
See "motivation"

Human need
See "need"

Hypotenuse
The longest edge of a right triangle

I

Image
The identity of an environment within one's mind, based on his or her perception of sensory cues; these sensory cues include color, motion, smell, sound, touch, kinesthesia, polarization of light, sense of gravity, electric or magnetic fields, and any other stimulus of the senses by one's surroundings (Lynch 1960)

Image making
Designing a space to elicit a particular image among it users

Indeterminacy
The characteristic of a set of data to lack substantial evidence for drawing a determinate conclusion

Indeterminate
Lacking exact and discernible limits or form (Oxford 2017)

Informal (in design)
Lacking the formalities of a typical design element of the same type; for example, "informal seating" is seating which may appear or function as a typical seating element would

Informal interview
A conversation which occurred organically and without a specific objective

Infrastructure
The basic physical and organizational structures and facilities needed for the operation of a group of people (Oxford 2017); the Trail and all of its amenities are included in this definition

Institutional Review Board
The authoritative committee within an institution on the approval of research on human subject; the purpose of this board is to protect the well-being of the researcher(s) and subject(s); since this study was conducted by a student with academic supervision by the University, the University's Institutional Review Board was utilized instead of a stakeholder's Institutional Review Board

Intercept (noun)
The act of intercepting

Intercept (verb)
To obstruct a circulating user from continuing his or her present circulation

Intercept session
A predetermined time and location in which to conduct an intercept survey

Intercept survey
A survey which intercepts users to gain a greater understanding of their views on a particular set of issues

International Dark-Sky Association
A global, multidisciplinary organization identifying, promoting awareness on, and working to reduce light pollution (adapted from IDA 2017)

Interpretation
The method or product of analysis of one's environment (adapted from Jerke, Porter, and Lassar 2008; Lynch 1960)

Intervention
An action or process which attempts to alter or affect the form or function of a site (adapted from Oxford 2017)

Irrigation flag
A small flag used to mark sprinkler heads when mowing; in this study, they were used to mark station points without using spray paint on the pavement

ISO sensitivity
A standardized and computerized function allowing a camera's sensor to pick up more light while sacrificing quality (Wilson 2017)

J

Jarvis
See "Jarvis Drive"

Jarvis Drive
A north-south street 0.2 miles east of the Trail

Jardine
A term used by locals to refers to the Jardine Apartments or to Jardine Drive at the south edge of this complex

Jardine Drive
The street separating the Jardine Apartments and the Trail; see Figure 1.01 for a map of its location

Jardine Apartments
An apartment complex located immediately northeast of the Trail; this complex is owned and operated by the Department of Housing and Dining

Jardine Trail
Lexicon used by the City for the Trail; this term is not used in the methods of the study, as it falsely implies an ownership of the trail by the University

K

Kansas State Agricultural College
The University's name after becoming a public, state institution in 1863

Kansas State University
See "the University"

Kerr
See "Kerr Drive"

Kerr Drive
A street to the northwest of the Trail; Jardine Drive becomes Kerr as it turns north

Kimball
See "Kimball Avenue"

Kimball Avenue
An east-west street 0.5 miles north of the Trail; also served as the northern property line for the Marlatt farmstead

Kinesthesia
One's self-awareness of his or her body, by means of sensory receptors in muscles and joints (Oxford 2017)

K-State
See "the University"

K-State Athletics
Most widely used term by locals for the University department which handles the finance, compliance, and marketing of student athletics; also used to refer to the physical facilities operated by the department

K-State Perimeter Loop
The official name of the trail to which the Trail belongs; this term is not used in the methods of this study, as it implies a greater network of trails than what this study covers

L

Landmark
A node which is not designated for human occupation but which serves as a point of reference of gaining one's bearings or determining the identity of a district (Lynch 1960)

Landscape
The visible and usable features of a given area of land (adapted from Oxford 2017)

Landscape architecture
The art and practice of designing the outdoor environment (Oxford 2017); this is a broad discipline which includes urban design, which is the focus of this study

Landscape element
A rudimentary part of a particular landscape form or space; for example, a particular quality about a space that is inherent to the space's character; this includes both design elements or designed elements

Landscape maintenance
The practice of regularly cleaning and caring for the aesthetic and functionality of the landscape

Landscape Services
A subsidiary of the Division of Facilities which handles all duties relating to University landscape; this does not include the Campus Planner

Lantern
A stagnant beacon-like lamp (adapted from Oxford 2017); lanterns are typically used at entry points to create a feeling of security and welcomeness (Hinkley Lighting, Inc. 2016)

Legibility
The apparent clarity of an environment; increased legibility leads to clearer images (Lynch 1960).

Light-emitting diode
A semiconductor using two terminals to produce light more efficiently than traditional bulbs

Light pollution (concept)
"Brightening of the night sky caused by street lights and other man-made sources" (Oxford 2017)

Light pollution (particles)
An term used in this report denoting specific photons of light in an environment which contribute to the existence of light pollution

Lighting
The practice of providing light for an environment

Lighting design
The subdiscipline of landscape architecture, urban design, and civil engineering which addresses the visibility aspects of design, focusing on electricity and form

Likert
See "Likert scale"

Likert scale
A spectrum upon which a subject is allowed to specify preference between two extremes; typically displayed as a series of numerical values, similar to multiple choice; for example, a Likert scale survey question may ask something to the effect of "on a spectrum of 1 to 5, rate..." (not to be confused with the definition of "scale" used in this book)

Literature review
A summary and analysis of literature which already exists on the topic of a study

Local road
A road which provides access to land with little or no through circulation; for example, a neighborhood cul-de-sac (FHWA 2012)

Local street
See "local road"

Longboard
A skateboard with an enlarged skate deck for increased balance and user stamina for long-distance trips (Highland 2010)

Love
The presence of intimate relationships in one's life (Maslow 1943)

Low Water Crossing
The lowers region of the Trail, extending from roughly STA 13+50 to STA 14+50, characterized by relatively frequent erosion and ponding; the term was coined in the comments portion of the intercept survey by one of several users who was frustrated with these ecological dilemmas

Luminary
Something which produces light

M

Maintain
The act of conducting landscape maintenance

Maintenance
See "landscape maintenance"

Manicured vegetation (in surveys)
A landscape environment with plant forms and colors which appear to be artistic and well-maintained

Mass (in vegetation)
See "massing (noun)" and "massing (verb)"

Massing (noun)
A large number of plants clustered together

Massing (verb)
The act of designing or implementing a massing

Master plan
A type of plan which comprehensively outlines recommendations for how a designed environment should evolve over time; in other words, a strategy for implementation of a (typically) large-scale plan

Matchline
The point at which two plan drawings or aerial images align; the purpose of a matchline is to allow large images to be enlarged on relatively small pages or screens; a matchline in one image will have an identically numbered matchline in another image to correlate the location of its features to those represented in the other image

Measuring wheel
A walking cane-like device with a rotating wheel which can be used to measure distance

Metadata
Data embedded within an electronic file or survey; metadata was used primarily in this study to document and analyze photograph GPS locations, manipulate GIS data, and code blind Likert scales

Method
A procedure used to collect data to answer the research question

Methodology
The system of methods used in a study (Oxford 2017)

Mixed-use
Denoting a building which features several programs; typically these programs are residential and retail

Mode of transportation
Any way by which someone or something circulates (adapted from Oxford 2017); some common examples include by foot, by bicycle, and by car

Modification
An intervention which alters a site's physical design

Mood
The aura created by a single design element or a combination of design elements (adapted from Oxford 2017)

Morrill Act
The United States legislation that enabled creation of postsecondary land-grant institutions

Motivation
The reason one acts or behaves in a particular way (Oxford 2017); in Maslow's "A Theory of Human Motivation," these reasons are based on one's desires

Multifamily
A housing structure which is typically home to several families

N

National Archives and Records Administration
An independent agency of the federal government which preserves and documents historical records

National Park Service
A federal government agency which manages public lands of significant stature

Natural
Any landscape environment occurring outside the context of a city, or resembling such; the opposite of urban landscapes (adapted from Oxford 2017)

Nature (character)
Having the innate presence of something

Nature (environment)
An environment which can be described as natural

Nature-like
Man-made to appear natural

Need
A desire which is required for one to sustain himself or herself (adapted from Maslow 1943 and Oxford 2017)

Nighttime economy
The utilization of night to conduct business (Brands, Schwanen, and Aalst 2015)

Nighttime programming
Programming for nighttime use

Node
A point at which paths intersect or significant activities occur (Lynch 1960)

Not to scale
An expression indicating that a given drawing should not be measured or used for technical purposes, typically because it is intended to convey a conceptual idea

O

Oil Crisis
See "OPEC Oil Crisis"

Oil Embargo
See "OPEC Oil Crisis"

OPEC Oil Crisis
An oil shortage in the United States in 1973 and 1974; caused by OPEC's embargo against the United States, who supported Israel in the Arab-Israeli War (PA 2017)

Organization of the Petroleum Exporting Countries
An intergovernmental organization which coordinates and unifies petroleum policies among member countries (OPEC 2017)

Overgrowth
The presence of vegetation below, at, and above eye level simultaneously; typically maintained solely by succession and occasional pruning

P

Parklet
"A small seating area or green space created as a public amenity on or alongside a pavement, especially in a former roadside parking space" (Oxford 2017)

Parks and Recreation Tax
See "quality-of-life tax"

Participant
A term used interchangeably with "subject" in this study, particularly when discussing the user survey

Path (in The Image of the City)
The route by which one circulates an environment (Lynch 1960)

Path (in this study)
The physical pavement of the trail which is referred to as "the Trail"

Perceive
To see, hear, or become aware of something through the senses (Oxford 2017); in this study, the term may refer to either an awareness developed through the analysis of one's environment, through a synthesis of his or her psychological preconceptions, through a synthesis of social or political constructs

Perception
A psychological construct formed through the act of perceiving

Phasing
"The action of dividing a large task or process into phases" (Oxford 2017)

Photo-elicitation
A research method where a photograph is displayed to a user to gauge his or her response (Brands, Schwanen, and Aalst 2015)

Photometrics
"Measurements of the intensity of light" (Oxford 2017)

Photovoltaic
Something which produces electricity from light (Oxford 2017)

Physiography
The natural or present quality of the land

Physiological homeostasis
The body's ability to maintain a normal physical state of being (Maslow 1943)

Pipher
See "Pipher Lane"

Pipher Lane
A local street immediately south of the Trail; provides the Trail with one access point; see Figure 1.01 for a map of its location

Place
A location with a given program about which is constructed an image (adapted from Oxford 2017)

Placemaking
Designing or planning to enhance place

Plan
"A detailed map or diagram" (Oxford 2017); essentially, a flattened aerial view of the Earth's surface and the development upon it

Plan view
See "plan"

Planned unit development
A type of future development and the regulatory process which guides developers in fulfilling this development (Center for Land Use Education 2005)

Planting design
A subdiscipline of landscape architecture which addresses the horticultural aspects of design

Precedent
A prior work of landscape architecture or urban design which features one or several ideas which should or should not be applied to the project being designed (the Trail)

Prime Place
The landlord of Collegiate Villa Apartments throughout the duration of this study; this term is also frequently used by locals to refer to the physical Collegiate Villa Apartments complex

Proctor
One who conducts a survey

Program
A series of activities and experiences which the space hosts, regardless of whether the designer intended them to occur within the space or not

Programming
The act of designing with the intent of inciting a particular set of programs

Prospect-Refuge Theory
To see into an environment without being seen; this is similar to "Habitat Theory" but without physically experiencing the given environment (Appleton 1975, 70)

Pruner
A device used for pruning

Pruning
The act of cutting branches off a tree or other wood-branched plant to improve its appearance or performance

Public interest design
Design which intends to improve the well-being of a community; the basis of this study's motivation

Pythagorean theorem
A mathematical formula which can be used calculate the hypotenuse of a right triangle

Q

Quality-of-life tax
A sales tax ballot measure for Manhattan which would redirect revenue intended for an already-fulfilled capital improvement towards a City park and several local middle school gymnasiums; this ballot measure was first publicized in April 2017 by Andrew Shores

Qualtrics
A software development company which provides interfaces for conducting statistical research

R

Raster (in GIS)
A pixel-based map, where each pixel contains metadata corresponding to geospatial phenomena

Regional & Community Planning
The official title of LARCP's urban planning major

Rendering
A visual depiction of a design proposal

Research question
The question which a study attempts to answer

Respondent
A participant in the stakeholder survey

Right triangle
A triangle which has one 90-degree angle

S

Safety
The condition of being protected from or liberated of from any thing which may cause a disruption from the comforts of a routine and comfortable life (adapted from Maslow 1943 and Oxford 2017)

Sales Tax
See "quality-of-life tax"

Scale
The magnitude at which a particular landscape is designed or viewed

Section
"A representation of the internal structure of something as if it has been cut through vertically or horizontally" (Oxford 2017); see also: "cross section" and "centerline section;" particularly useful for conveying the relationships between spaces and users

Security
The state of being free from danger or threat (Oxford 2017); essentially, a perception of safety within one's environment

Segment
A defined portion of a trail

Self-actualization
The realization that one is doing what he or she is fitted for (Maslow 1943)

Semantic-differential scale
A measurement used to gauge a research subject's connotative understanding of a given thing (Sommer 2017; not to be confused with the definition of "scale" used in this book)

Sensor (in photography)
A screen which picks up light; the modern equivalent of a filmstrip (Wilson 2017)

Shapefile
A particular type of data file used in GIS software

Shareholder
A stakeholder owning financial stock in a company

Shutter
A device on a camera that opens and closes, exposing the sensor to light, capturing the photo (Wilson 2017)

Shutter speed
The amount of time which a camera's sensor is exposed to light (Wilson 2017)

Signage
A notice on public display that gives information or instructions in a written or symbolic form (Oxford 2017); this is also a medium for wayfinding

Single-family
A housing structure which is typically home to one family or the equivalent number of residents

Situational crime prevention
The act of attempting to prevent crime in a given scenario, typically one which is anticipated (Brands, Schwanen, and Aalst 2015)

Sketch overlay
The process of sketching on tracing paper over a photograph or rendered image to explore design ideas

Sociological well-being
A term used in this study to simplify Maslow's love, esteem, and self-actualization into one category based on their relative similarity compared to physiological homeostasis and safety; the idea that one can experience complete health, community, awe of life, and moments which create memories, particularly in a given environment

Space
Three-dimensional field within which form and experience occurs (adapted from Ching 2007)

Specification
"A detailed description of the design and materials used to make something" (Oxford 2017)

Spotlighting
A type of uplighting which is intended to highlight a particular design element as its focal point (adapted from Hinkley Lighting, Inc. 2016, 10)

Stakeholder
A person or group of people with an interest or concern in a particular matter (Oxford 2017); in this study, the term refers to any party which owns or operates land on or adjacent to the trail, including both individuals and groups in the public and private sector

Stakeholder survey
A survey which attempts to gain a greater understanding of stakeholders' views on a particular set of issues

Station point
A relative measurement used to easily assign nomenclature to a set of geographic coordinates along a corridor; traditionally used by civil engineers for road measurements; in this study, the station points were named based on their proximity to College along the circulation route (for example, STA 01+65 reads as "station point one hundred sixty-five," or 165 feet east of College when following the path)

Stress Reduction Theory
The theory that if a stressed individual encounters a natural environment, his or her stress will be reduced, while encounters with urban environments will prevent stress from being reduced (Ulrich et al. 1991)

String trimmer
A machine used to cut down vegetation in locations which are difficult to mow; more efficient than pruning

Study site, the
A term used circumstantially in this study to refer to the physical location and boundaries of the Trail

Subject
A participant in a research study

Subjective factors
Factors in a study which are based on personal preference and influence the results of the study

Succession (in ecology)
The process by which one plant community or species successively gives way to another until ecological stability is reached (adapted from Oxford 2017)

Sucker
A tree which has sprouted at the base of a mature tree

T

Tactical urbanism
The practice of implementing low-cost, temporary interventions that improve local neighborhoods (Pfeifer 2013)

Technology
"The application of scientific knowledge for practical purposes" (Oxford 2017)

Title IX (pronounced "Title Nine")
"Title IX of the Education Amendments Act of 1972 is a federal law that states: 'No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance'" (NCAA 2014)

Topography
Three-dimensional form of the land

Trail (lowercase first letter)
The circulation route which composes a contained corridor environment

Trail, the (capitalized first letter)
A stretch of trail in Manhattan, Kansas used as the focus for this study; may also refer to the physical extents of the trail, as defined in the Introduction & Background of this report

Transit-oriented development
An urban development strategy focused around alternative transportation

Transparency
"The degree to which people can see or perceive what lies beyond the edge of a street or other public space and, more specifically, the degree to which people can see or perceive human activity beyond the edge of a street or other public space" (Ewing and Bartholomew 2013, 15)

Tunnel, the
A region of the Trail extending from roughly STA 06+00 to STA 08+00, characterized by nearly continuous overgrowth and fences on both sides of the path; the term was coined by a toddler in an informal interview

U

University
Used in some contexts of this study as a shortened form of "University Drive"

University, the
A term which shortens the name "Kansas State University" for the purposes of this study; in this study, the term refers to both the physical campus of both the university's governing body and Manhattan's physical campus of the university; other terms which locals refer to the University as include K-State and KSU

University Drive
A local street immediately south of the Trail; provides the Trail with one access point; see Figure 1.01 for a map of its location

Uplighting
Lighting which is cast upwards onto a surface or object (Hinkley Lighting, Inc. 2016, 10)

United Methodist Church
A global Christian denomination which owns and operates College Avenue UMC, located northwest of the Trail, across College Avenue

United States Department of Agriculture
A cabinet-level federal agency that oversees the American farming and ranching industry; this agency owns a facility to the southwest of the Trail, across College Avenue

Urban
Any landscape environment occurring within the context of a city; the opposite of natural landscapes (adapted from Oxford 2017)

Urban corridor
A corridor occurring within an urban environment (see also: "corridor" and "urban")

Urban design
A branch of landscape architecture which focuses on the design of streetscapes, pavilions, and other urban landscape elements heavily that are heavily influenced in design by topical overlaps with the disciplines of architecture and urban planning

Urban heat island effect
The condition where an urban area possesses higher temperatures than its surroundings due to the presence of large surface areas of impermeable surfaces, typically in the form of infrastructure (OAR 2017)

Urban planning
The planning and regulation of construction and development in an predetermined urban area (adapted from Oxford 2017)

User
Any person who uses the landscape or an landscape element (adapted from Oxford 2017); in this study, the term typically refers to those who use the Trail

V

Viewer
A person who observes the landscape with his or her senses, but does not use it; see also: "Prospect-Refuge Theory"

Volunteer (in ecology)
A naturally-occurring plant which sprouts up without human intervention and typically in a separate location from those the same species

W

Wayfinding
The ability of one within his or her environment to critically think about his or her surroundings in order to arrive at his or her destination; this includes, but is not limited to, signage (University of Michigan 2016)

Weed eater
See "string trimmer"

Weed wacker
See "string trimmer"

Westar
See "Westar Energy"

Westar Energy
The electric service provider for Manhattan, Kansas

APPENDIX B: WORK PLAN

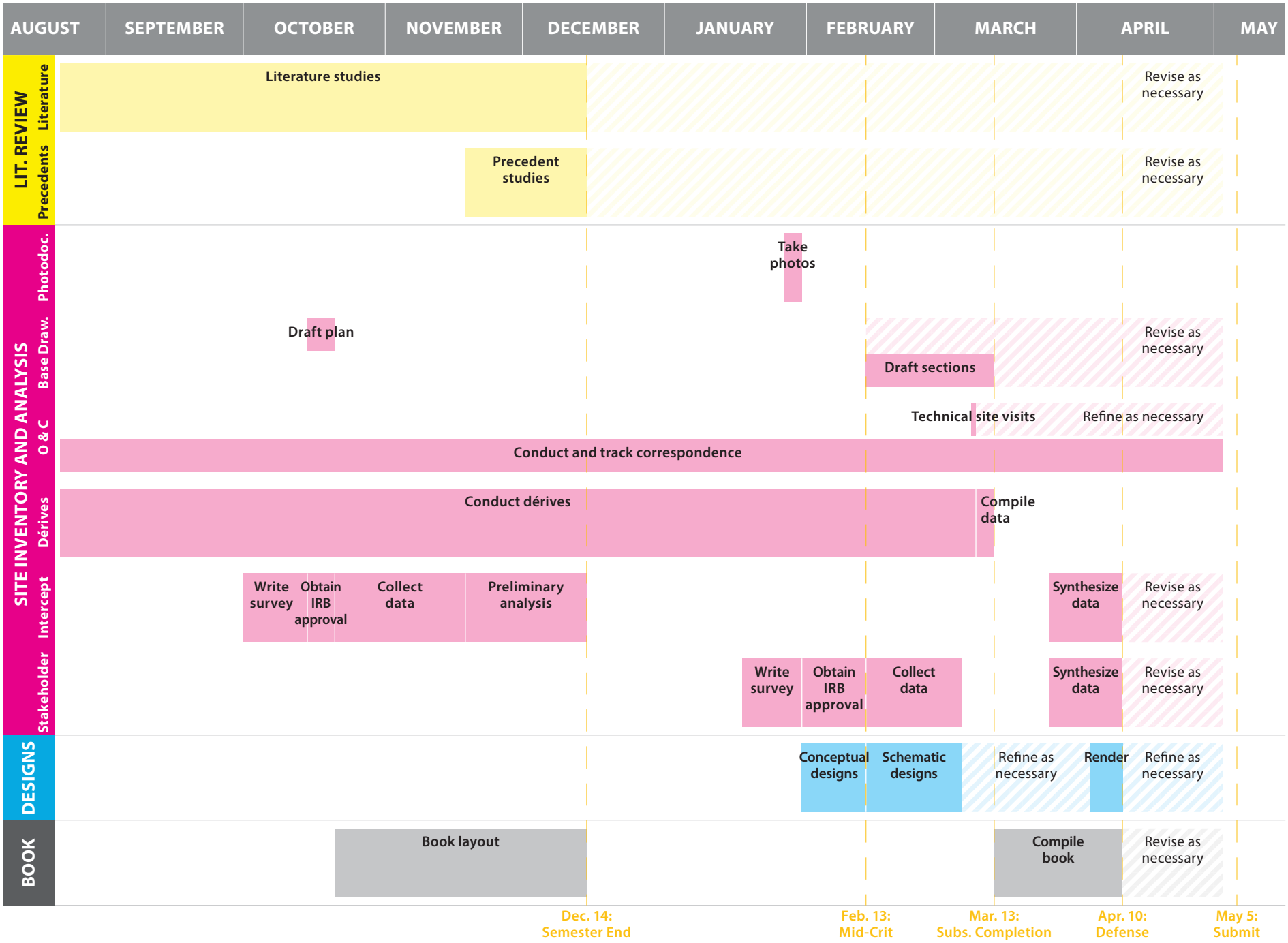


Figure 7.01 Study completion schedule

APPENDIX C: ANNOTATED BIBLIOGRAPHY

FEAR OF CRIME AND AFFECTIVE AMBIGUITIES IN THE NIGHT-TIME ECONOMY

(Brands, Schwanen, and van Aalst 2015)

KEYWORDS

Nighttime economy, situational crime prevention, safety, photo-elicitation, fear of crime, ambiguity of fear, empirical research

SUMMARY

The nighttime economy (NTE) is an industry which has grown significantly over the last century, particularly due to advances in lighting technology. With the presence of nighttime economy in an urban area, there tends to be a stigma of crime. In order to keep nighttime economies functioning, local governments have been known to install situational crime prevention (SCP) measures – video surveillance, police, and lighting elements, among others – to make spaces feel much safer at night. However, feminists have long argued that a dogmatic perspective of crime in NTEs should not be based upon the environment of NTEs, but on "the socially constructed meanings inscribed into the environment." In this study, the authors conduct a series of photo-elicitation interviews in an attempt to analyze the root of fear of crime and examine urban design users' perceptions of lighting, policing, and other contemporary practices.

Brands, Schwanen, and van Aalst begin their literature review by providing an understanding of fear of situational crime. Fear of crime, they say, is rooted in emotion and produces physical and sociocultural effects. The emotions they include within "fear of crime" are "unease, discomfort, anxiety, apprehension, and panic." They note that triggers of fear of crime arise over time, rather than being preconscious. They note that this fear can be influenced by others, but the effect of the influences may never be permanent. By studying a person's past experiences, they say that a researcher can begin to understand how a person

has arrived at their present conclusions about their environment. When this fear is provoked, a lack of knowledge about one's future can lead to a lack of understanding in how to handle situations of unsafety. The authors then arrive at a framework for an empirical study which focuses most heavily on the ambiguity of fear. In their methods, they focus on "different individuals responding differently to a particular element," "the same individual responding differently to a particular element," and "the same individual responding in multiple ways [simultaneously] to a particular element."

The study is conducted in a mid-sized city in the Netherlands which has a large population of young people. The study's subjects were NTE consumers in three different student housing complexes who were intercepted as they walked. Each subject was interviewed three times, each time by researchers of the same sex. Subjects were shown a series of nighttime urban landscapes and asked to evaluate them on a Likert scale based on how comfortable or uncomfortable the landscape made them feel. Included in these photos were scenes of lighting designs, police stations, and other forms of SCP measures. The interviews were transcribed verbatim.

The results of this Brands, Schwanen, and van Aalst's study revealed several significant ideas. The presence of lighting reduced fear of crime. The presence of police, however, only reduced fear of crime without any side effects in one third of the participants. Among the other characteristics of the photos, the main characteristic noted in the article is the presence of a crowd outside a bar. This photo, the authors report, produced generally positive results in reducing fear of crime.

RELEVANCE

This study provides a glimpse into the images developed by various nighttime scenes. While some forms of nighttime safety measures may be appropriate ways to make users feel safe in the landscape, not all have the intended effect. Its analysis of how images are developed and reshaped provides insights into the factors which affect one's image.

UNDERSTANDING AND MEASURING BICYCLING BEHAVIOR: A FOCUS ON TRAVEL TIME AND ROUTE CHOICE

(Dill and Gliebe 2008)

KEYWORDS

Alternative transportation, bicycling, arterial road, local road

SUMMARY

This report explores the possibilities of bicycling as an alternative mode of transportation. It asks, "How often, why, when, and where do cyclists ride?" in the Portland, Oregon metropolitan area, in order to attempt to find patterns in motivation between study subjects. GPS tracking systems were attached to subjects' bicycles, and the routes and timing of routes were analyzed. The results of the study were synthesized to provide a list of urban planning policy implications regarding bicycle use.

The produced several key findings. Bicyclists primarily ride for utilitarian purposes in urban environments, and rarely for exercise. These riders have a tendency to "trip chain." When selecting a route, they typically do not choose the most direct route, but instead, the route which feels safest, especially females and inexperienced riders. For all trips, the average distance was 2.8 miles; the average estimated driving time for all trips was over 13 minutes longer. However, this disparity was much less for many of the bicycle routes which covered a shorter distance than the average.

POLICY IMPLICATIONS

Quality bicycle infrastructure is a valuable asset to a community. For short trips, bicycles can be an efficient replacement for vehicles. Local streets and bicycle routes away from streets may encourage women and inexperienced riders to ride more often. A street network with many connections increases efficiency among riders. Finally, although arterial streets tend to be used less than other bicycle routes, the addition of more bicycle lanes to an arterial street many encourage riders to take such routes more often.

RELEVANCE

Because the bicyclist develops his or her route patterns by thinking at the urban planning scale, Dill and Gliebe provide helpful insights into the implications that urban planning has at the site scale. It provides a working understanding of bicyclists' motives and choices for routes.

PEDESTRIAN- AND TRANSIT-ORIENTED DESIGN

(Ewing and Bartholomew 2013)

KEYWORDS

Place, placemaking, urban design, urban planning, transit-oriented development, pedestrian, precedent, design element

SUMMARY

This book attempts to bridge the gap between urban planning and urban design in the concentration of pedestrian and transit infrastructure. It assesses the urban design qualities which are necessary to plan a community with successful modes of transportation in these two areas. These qualities are categorized into one of three priority levels, ranging from most important to least important in the pedestrian and transportation success of urban spaces. It concludes each priority level with a series of design form types which exemplify the qualities listed. Along the way, the book also summarizes precedents of urban planning policies at the local scale that have successfully employed such design qualities.

ESSENTIAL DESIGN ELEMENTS

The key to successful placemaking, Ewing and Bartholomew say, is "imageability," or the ability of a landscape to utilize physical environments to provoke feelings and therefore, create a lasting impression on the user. Enclosure, or the proportion of vertical design elements to the horizontal design elements, should be used to give character to a space. The scale of a human to the design forms and details around him or her must be considered in order to make an environment attractive. Safety of an environment should be addressed with the mindset of providing transparency, or the ability of a user to perceive what lies beyond their immediate surroundings. Complexity, or the provision of variety and intricacy in form, amenities, and wayfinding, enriches the user's experience of an environment. Consistency and complementariness in design elements, properly termed "coherence," provides a sense of visual order to an environment, decreasing the amount of interpretation the user's mind must process. Building from that, environments and networks must be legible, or easily understood and navigated. Finally, linkages, the physical and visual connections between nodes in a network, unify highly developed urban plans.

HIGHLY DESIRABLE DESIGN ELEMENTS

The authors encourage including commercial programming which supports and supplements the modes of transportation in a network, in order to provide resources for network users and develop the local economy. Layout of streets in a grid-like fashion increases the efficiency of circulation. Traffic calming measures can increase the safety of specific programs. Closely spaced spade trees provide comfort for users and economic energy-use benefits for nearby buildings. Reducing the amount of "dead space" (unprogrammed or unutilized spaces) within a network leads to a general feeling of safety and community among users. Nearby public parks and open spaces are seen as attractions to users, bringing them into an area. The presence of

small buildings, especially in the midst of large ones, allows the user's cone of vision to absorb his or her entire surroundings. Pedestrian-scale lighting systems are more comfortable to the user than the traditional "freeway-style" lights. Transit facilities which are attractive to the user are more appealing to potential users than functional-only ones.

WORTHWHILE (BUT NOT ESSENTIAL) DESIGN ELEMENTS

Ewing and Bartholomew reinforce Kevin Lynch's emphasis on incorporating wisely-designed landmarks (Lynch 1960), stating that these design elements provide users of urban environments with a resource for both wayfinding and image development. "Walls" for streets can be formed using buildings, a concept which provides users with a sense of visual enclosure, and if these buildings are programmed in a transparent way, the streets will in turn be activated. Street furniture provides users with necessary amenities, but it must be functional. Signage should be included, but only in a coherent, small-scale way, so as to avoid cluttering the legibility and wayfinding of the landscape. Special pavement types enhance the visual character of the landscape "floor," which together with "walls," can create a warmly intimate space. Public art increases pedestrian use of a network. Water features holistically engage all five senses of the user. Outdoor dining also appeals to the senses, while adding imageability, complexity, and linkage. Finally, underground utilities are preferred to above-ground utilities, as they increase accessibility of a space to vehicles and reduce tree maintenance needs.

RELEVANCE

The book has an extensive list of design elements which encourage foot traffic in urban environments. The level of detail provided for each element, along with precedents of how these elements have been successfully employed will be useful to understanding what types of design features are necessary to respond to the issues presented by the Trail.

SKATEBOARDING FOR TRANSPORTATION: AN EXPLORATION OF THE CHARACTERISTICS AND TRAVEL BEHAVIOR OF AN EMERGING ACTIVE TRAVEL MODE

(Fang 2016)

KEYWORDS

Alternative transportation, mode of transportation, skateboards, longboards

SUMMARY

Skateboarding (including longboarding) is becoming an increasingly more popular mode of transportation. Yet, little research exists on the urban planning and design matters which relating to the mode. This dissertation examines its popularity throughout the West Coast of the United States, its feasibility as a mode of transportation, and its implications for public policy.

The study begins by exploring the validity of research on skateboarding as it relates to the discipline of urban planning. It establishes that although it is an uncommon mode of transportation, it has a visible presence in many West Coast cities. However, much of the existing data on the topic does not distinguish between travel and recreation purposes.

Interviews conducted by Fang indicate that skateboarding is chosen for transportation for primarily for practical reasons. However, his subjects also note an additional entertainment value which the mode provides. Many gaps still exist in understanding who uses this mode, why they use it, and whether it can be considered a valid alternative mode from a physical safety standpoint. Through his observations of users and analysis of injury and fatality statistics, he concludes that there is a trade-off which typically happens. While skateboarding is known to contribute to more injuries and fatalities than other wheeled, non-motorized forms of transportation, many users of the mode are willing to accept this hazard for the sake of enjoying moving about urban environments.

Fang concludes that due to its growing appeal, considerations which make skateboarding possible in urban environments should be given a greater focus in urban planning. Currently, he says, the suitability of skateboards coexists with other forms of transportation, and while millions of miles are covered by people traveling by skateboard in California alone, not much attention is currently placed on this mode in public policy. The mode should be considered as an alternative to walking and bicycling, he argues, since it has similarities in kinesthetic motion to both. Therefore, improvements to pedestrian and bicycle infrastructure would also be inclusive to skateboarders. However, in some locations, skateboarding is outlawed or discouraged, a contrary practice to the idea of a "complete street." Skateboarding also provides an additional resource for minors in need of a mode of efficient transportation. Fang advises standardizing skateboard regulation throughout a given district or region and ensuring that all parties (skateboarders, police, passersby, etc.) are of the same understanding when it comes to enforcing these policies. He also recommends considering skateboarding with the same level of respect and understanding in the urban

planning process as other modes of transportation. Finally, he provides several suggestions for skateboard-specific infrastructure policy: paved routes separated from traffic, attention to the level of detail which the pavement (and landscape debris on it) is maintained, opportunities for skateboards to be taken into public places, and connections between skateboarding routes and public parking to allow skateboarders to cover greater travel distances while still partaking in the mode.

RELEVANCE

This dissertation adds another perspective into the various forms of alternative transportation that exist. Including considerations for skateboarders would expand the capabilities of the design to more than just the pedestrians and bicyclists.

URBAN DESIGN: IS THERE A DISTINCTIVE VIEW FROM THE BICYCLE?

(Forsyth and Krizek 2011)

KEYWORDS

Bicycle, urban design, experience, needs, programming, scale, experiential design

SUMMARY

This article is a report on urban design as it relates to bicyclist-users. Some of the content discussed in this article is an expansion of research previously conducted by the two regarding urban planning and bicycle infrastructure.

Forsyth and Krizek outline the needs of cyclists and compare them with those of pedestrians and vehicles. They compare and contrast pedestrians and bicycle circulation to evaluate the validity of lumping these two programs into the same category ("non-motorized"), a practice which is typically utilized in urban design and planning. They determine that while there are some commonalities between the two (for example, the inability of each to carry large loads), the two have vastly different qualities while in circulation. These differences in character include typical speeds, rider safety needs, and their respective ranges of travel. They also note the potential of bicycles to be combined with public transit in one's circulation pattern.

Then, they outline widely used approaches to designing for circulation, particularly focusing on bicycles. Standard practices include viewing cycling as a city-scale network, paying close attention to the safety needs of riders, involving riders of different ages and abilities in the planning processes, and ensuring that routes are well-lit include adequate signage. They also provide suggestions for improvements to these current planning practices.

Forsyth and Krizek analyze their findings to synthesize a bicycle-focused approach to urban design. They provide the reader with a series of design guidelines for planning at the network scale, planning cycling facilities, planning and urban design processes, and detail-scale design.

The authors conclude with an argument for more attention to be placed on satisfying the psychological needs of bicyclists in urban design. They point out that while there has been much research conducted on the design of the functional aspects of bicycling networks and facilities, there has been little to no research conducted on aspects of experiential design for bicyclists.

RELEVANCE

This report provides several design guidelines that apply specifically to urban design at the site scale, including ones for lighting, safety, and site amenities.

URBAN DESIGN AND THE BOTTOM LINE: OPTIMIZING THE RETURN ON PERCEPTION

(Jerke, Porter, and Lassar 2008)

KEYWORDS

Bottom line, dividends, perception, precedent, green infrastructure, modes of transportation, form

SUMMARY

Jerke, Porter, and Lassar argue that good design has two direct results on the quality of urban design: an increased bottom line and a heightened public image of the space. A vast majority of the book is an analysis of successful pieces of urban design which exemplify these claims, primarily in the United States. They distill these precedents into four categories. These categories are architecture (of buildings), green infrastructure, transportation, and design in water settings. Through their analysis of these precedents, they provide a series of design guidelines for several types of environments within each of the four categories.

They describe the constantly-evolving nature of contemporary practices in the architecture of buildings, and show how these are a reflection of the specific issues which most affect the given city. Due to the ambitious nature of the discipline to solve these problems, they say, it is becoming an increasingly more complex industry with scopes that are expanding to provide more services to the client.

Green infrastructure must be treated holistically as a network, they say. They also emphasize the importance of strategic planning within this concentration, stating that the environmental effects must be calculated years in advance in order to produce the greatest return, a high quality of life.

The authors claim that due to the contemporary design treatment of modes of transportation as functional rather than aesthetic, "traveling is a chore and provides few pleasurable moments." This is a stark contrast from the act of traveling in the early twentieth century, they say. The precedents they display in this chapter covers everything from pedestrian infrastructure to vehicles and planes to public transit.

Jerke, Porter, and Lassar point out the importance of surface water to design from both a functional and aesthetic standpoint. They describe, however, that incorporating water into design successfully can be a difficult task, due to the human tendency to degrade the resources.

RELEVANCE

An understanding of design concepts which maximize the image a person constructs about their environment (see Lynch 1960) can be gleaned from the precedents in this book.

TWILIGHT GARDEN

(Leendertz 2011)

KEYWORDS

Planting design, amenities, nighttime programming

SUMMARY

This book is a manifesto on garden design for nighttime programming, written by a gardening advice columnist. In it, Leendertz argues that planting and maintaining a garden which appeals to the senses at night will activate the space, encouraging the gardener and his or her loved ones to spend their time in the garden at night, rather than indoors.

Although much of this book is devoted to the process of selecting plant species, Leendertz is careful to begin the book an overview of the design, construction, and maintenance requirements of a nighttime garden. Some considerations provided include preserving the maturity of the garden versus starting "with a blank canvas," determining the placement and form of the physical amenities, preparing the soil, and scheduling the ephemeral implementation and maintenance tasks correctly. Once these provisions are made, she says, the garden user can begin implementing the planting design.

Leendertz describes in Part 1 the various sensory appeals that can be included in garden design. She does this to argue that successful designs are stimulating to the senses. To increase visibility in a space, she recommends selecting plants with light-colored foliage or flowers, as these which reflect light. In doing this, however, one must also be mindful of the sensory appeal of the garden during the daytime, and therefore its color palette. Species with scents, especially those which are dormant during the daytime can increase the garden's appeal, but must be positioned tastefully. Lighting can have a variety of effects on the user experience which must be considered. She recommends considering the methods by which lighting is powered. Moonlight, she says, can also be an effective source for lighting a garden. Still water can reflect moonlight, while running water can appeal to the ears. Some amenities and plant species are capable of attracting wildlife (for example, frogs and fireflies) which add to the entertainment value of the space. To avoid the use of the garden by large wildlife, she discourages including fish in water amenities. The final two considerations she provides are to organize space in a way that is conducive to user privacy, and to understand one's own sense of taste as a designer-user.

Part 2 provides an extensive list of recommended plants for nighttime gardens in three categories: "star plants," "supporting cast," and "backstage beauties." It also provides sizing, soil and other requirements, and a detailed description for each plant.

RELEVANCE

This book will provide a great insight into understanding the forms and appeal of plants in design, especially at night, which the other sources do not. It provides a good overview of site suitability considerations. It also explains the practical consequences of selecting particular plants.

THE IMAGE OF THE CITY

(Lynch 1960)

KEYWORDS

Image, legibility, paths, edges, districts, nodes, landmarks

SUMMARY

Lynch conducts a psychological study of perception of physical form in urban environments, in order to provide a foundational theory on how the human constructs his or her mental image of the city around them. He analyzes legibility in depth, and concludes that the way a person constructs his or her image is an indication of the quality of its designed form. His research methods include analysis and mapping of the sensory cues in three cities (Boston, Jersey City, and Los Angeles), and a series of lengthy interviews with long-term residents of these cities. He synthesizes his findings into five design elements: paths, edges, districts, nodes, landmarks.

PATHS

Lynch describes paths as the route through which one circulates the city. Circulation along these routes can happen in any form, whether by foot, cycle, motorized vehicle, or other forms of transit.

EDGES

Lynch describes edges as the periphery of the paths. These are "linear" elements which define spaces and influence one's perceptions along their path.

DISTRICTS

If paths and edges are drawn on a map, the districts are what Lynch describes as a "two-dimensional" conglomeration of these one-dimensional elements. Districts are regions which influence one's perception of the world around him or her.

NODES

Lynch characterizes these elements as significant zero-dimensional points within a district which determine and reflect the path user's mental identity of the district. Some examples of nodes are intersections of paths, clusters of programs, and changes in physical form.

LANDMARKS

Also zero-dimensional points, Lynch describes these elements as nodes which the user does not enter into, but uses primarily as a tool for wayfinding.

RELEVANCE

This book provides a good overview of the ways in which users of urban environments interpret the world around them.

A THEORY OF HUMAN MOTIVATION

(Maslow 1943)

KEYWORDS

Human motivation, human needs, physiological homeostasis, safety, love, esteem, self-actualization

SUMMARY

At a time when not much research or theory on human motivation existed, psychologist Abraham Maslow provides a framework for human motivation. This framework is based on his own clinical experience and from the influence of several fundamental theorists in the field of psychology. It attempts to explain the rationale behind human desire and the precedence of each level of human desire. He categorizes all desires as motivations which fulfill the following list of needs, each taking precedence in a human's consciousness over the needs which fall into the subsequent categories on the list: physiological homeostasis, safety, love, esteem, and self-actualization. For example, if one is not maintaining physiological homeostasis, he or she will be more consumed by his desire for this than his or her desire for love; whereas if love is the strongest of that person's desires, his or her physiological needs have already been met.

PHYSIOLOGICAL HOMEOSTASIS

Maslow describes psychological homeostasis as the body's ability to "maintain a constant, normal state of the blood stream." To maintain this homeostasis, he defines the needs necessary to be met as oxygen, water, dietary needs, and hormones. Other physiological needs are not included in this list, as they are not necessary for the body to maintain homeostasis; these include physical touch and maternal behavior, among others.

SAFETY

While Maslow never defines the word "safety," he describes it as the most basic of all psychological needs (see the Glossary for a more defined explanation of safety). Elements which contribute to safety include a lack of illness, a routine or rhythm without disruption, a stable family life, and an appropriate degree of exposure to stimuli when stimuli are present. His theoretical foundation of this category of needs comes from his experience working with children, as their reactions to lack of safety, he claims, are more candid and expressive than adults.

LOVE

Maslow defines love as the presence of intimate relationships in one's life. While this includes in part sexual intimacy, Maslow describes intimate relationships as a much broader term which encompasses any relationship where affection is exhibited. This, he says, typically happens in the form of friends and family.

ESTEEM

Esteem, Maslow says, is having "a stable, firmly based, (usually) high evaluation" of oneself and of those around them. He explains that a satisfaction of one's esteem needs leads to confidence, a feeling of adequacy, and psychological strength, all of which together lead to independence.

SELF-ACTUALIZATION

Self-actualization, as defined by Maslow, is the opportunity for one to live out their calling, so to speak. He describes this as the knowledge within oneself that he or she "is doing what he is fitted for." A lack of self-actualization, he says, leads to restlessness and discontentment.

RELEVANCE

Understanding human needs on the most basic level will be essential in the research and design process. Trying to solve complex problems relating to how people interpret their surroundings will require a basic knowledge of psychology which this framework provides.

THE LANDSCAPE LIGHTING BOOK

(Moyer 2013)

KEYWORDS

Lighting design, project development, client, safety, security, aesthetics, technology, mood

SUMMARY

This book attempts to fill the gaps in knowledge in the landscape architecture concentration of lighting design. Moyer wrote this book as a practical resource for understanding landscape lighting concepts and developing a landscape lighting plan, as no such book previously existed. The contents included are primarily based on her extensive work experience in the concentration.

Part I describes the project development process. Moyer stresses the importance of gaining a holistic understanding of the client's needs and expectations, including their perception of various lighting styles and the financial, time, and physiographical constraints of the project. She then describes the scientific process of how the eye reads light and sends information to the brain. The objectives of lighting design are outlined, namely safety, security, and aesthetics. These, she says, can be employed in landscape lighting by manipulating its formal composition, mood, and direction, among many other things. She then describes the process by which a design is documented, constructed, evaluated, and updated.

Part II covers the materials and technology of a landscape lighting design. Here, Moyer describes the various types and components of light sources (including LEDs, a heavily used and relatively new technology in the industry) and fixtures. She also describes the considerations which must be made for materials, finishes, corrosion prevention, control systems, and power.

Part III applies the information from Parts I and II to the design of residential, public, and atria landscape lighting systems. The clients on residential design projects, she says, can vary in their knowledge of the topic and methods, but there remains a set of landscape architectural considerations which highlight the aesthetics and improve the function of both the residence and landscape. Public projects, on the other hand, are more concerned with safety and security of the landscape user. Additional objectives also typically exist on public sector projects, requiring the use of particular lighting systems, as these projects tend to be at a larger scale than residential projects.

Part IV describes how the character of landscape elements may influence lighting design vice versa. In this part, Moyer outlines considerations to be made for plants and plant maturation, lighting power, seasonal changes in the landscape, sculptures, architecture (of buildings and other structures), circulation, and water features.

RELEVANCE

This is an incredibly detailed manual that essentially walks the reader through the lighting design process and upkeep needs from start to finish. To begin a working knowledge of lighting during the design process, it will be essential to introduce the concepts in here in the literature review.

HEALTH EFFECTS OF VIEWING LANDSCAPES – LANDSCAPE TYPES IN ENVIRONMENTAL PSYCHOLOGY

(Velarde, Fry, and Tveit 2007)

KEYWORDS

Environmental psychology, urban design, urban, natural, viewer, landscape elements

SUMMARY

Velarde, Fry, and Tveit provide a comprehensive review of existing literature on the individual and social health effects of viewing landscapes. This stems from a widely held theory that landscape elements, particularly vegetation and water, reduce stress and improve one's well-being. Through their analysis of previous research on the health effects of viewing landscapes, they discovered several trends which reinforce this theory.

METHODOLOGY

After sifting through 3800 journals, the study reviews thirty-one studies whose findings display the relationship between landscape and human well-being. These studies include "landmarks" in landscape architectural theory, such Roger S. Ulrich's Stress Recovery Theory and Rachel and Stephen Kaplan's Attention Restoration Theory, as well as controlled research experiments. Every one of the thirty-one studies conducts its study in several ways, including views of natural versus urban environments and range in amount and type of landscape greenery.

FINDINGS AND DISCUSSION

In the natural versus urban studies, natural landscapes produced entirely positive health effects, whereas urban landscapes produced a mixture of both positive and negative health effects. For the range in amount and type of greenery studies, Velarde, Fry, and Tveit found that more greenery in one's environment leads to increased health effects, but none of these provided specific information about what types of greenery produced the greatest benefit.

In short, this study determined that viewing landscapes influence the human body in three main ways:

- Short-term psychological recovery from stress and mental fatigue
- Physical recovery from or immunity from an illness
- Long-term behavioral improvements, increased social interaction, and reduction of aggressive behavior

Velarde, Fry, and Tveit determine in that although many of the studies they reviewed revealed similar results, the amount of specific information about landscape elements addressed is very shallow. They determine that while the generalization of landscapes into categories for the sake of analysis provides a good method for gaining an overall understanding of the landscape's effects on the viewer, only five of the studies reviewed provided an analysis of the difference in effects of specific landscape elements on the viewer. They conclude that there is a need for further research to be conducted on environmental psychology as a means to more comprehensively inform urban design, particularly in understanding the effects of urban design elements.

RELEVANCE

This study summarizes the findings of Kaplan and Kaplan, Ulrich, and several dozen others into one source. To understand the effects landscape architecture can produce on the human psyche, it will be important to consider the findings of this study. Rather than each of analyzing these prior studies, all the information from these studies has been consolidated into one article.

SUBJECTIVE EVALUATION OF LUMINANCE DISTRIBUTION FOR INTELLIGENT OUTDOOR LIGHTING

(Viliūnas et al. 2014)

KEYWORDS

LED, subjective factors, luminary, semantic-differential scale, Likert scale, factor analysis

SUMMARY

This study evaluates intelligently controlled LED-based landscape lighting systems. It conducts a subjective evaluation of the lighting type, whereas all prior research on this lighting type conducted on objective evaluations. The study subjects are landscape users.

Constructing the study was a three-fold process. First, a group of women were asked to independently evaluate a set of six overhead lights on a closed street, as the dimness of these lights was adjusted in varying combinations. Each subject received the same series of combinations, but in randomized order. The combinations which created unanimously unfavorable environments for the subjects were eliminated, leaving seven combinations. Then, a group of psychology students determined a series of appropriate antonym pairs for aspects of lighting quality in Lithuanian (the language the study was conducted in). These pairs were used for a semantic-differential scale series of questions. Using this scale, female subjects in their twenties were asked to evaluate photographs of the seven lighting combinations. The four combinations which produced the least favorable results were then discarded. Finally, a Likert scale was developed based on Jay Appleton's Prospect-Refuge Theory. A smaller group of these same subjects was randomly selected to evaluate the remaining three combinations on a Likert scale.

In the study, the authors determine that for roughly two thirds of the subjects, their personal well-being was the motive behind their responses. The authors also indicate that roughly one out of every ten participants attributed their responses to the quality of the landscape environment the lights were set within.

RELEVANCE

This study shows that the landscape environment may not be as significant to its user in terms of nighttime safety as is the quality of the lighting.

APPENDIX D: PHOTODOCUMENTATION

Figure 7.02a Photodocumentation taken at STA 00+00 (westernmost access point), facing east (Wilson 2017)

Figure 7.02b Photodocumentation taken at STA 01+00, facing east (Wilson 2017)

Figure 7.02aa Photodocumentation taken at STA 00+00 (westernmost access point), facing west (Wilson 2017)

Figure 7.02bb Photodocumentation taken at STA 01+00, facing west (Wilson 2017)

Figure 7.02c Photodocumentation taken at STA 02+00, facing east (Wilson 2017)

Figure 7.02d Photodocumentation taken at STA 03+00, facing east (Wilson 2017)

Figure 7.02cc Photodocumentation taken at STA 02+00, facing west (Wilson 2017)

Figure 7.02dd Photodocumentation taken at STA 03+00, facing west (Wilson 2017)

Figure 7.02e Photodocumentation taken at STA 04+00, facing east (Wilson 2017)

Figure 7.02f Photodocumentation taken at STA 05+00, facing east (Wilson 2017)

Figure 7.02ee Photodocumentation taken at STA 04+00, facing west (Wilson 2017)

Figure 7.02ff Photodocumentation taken at STA 05+00, facing west (Wilson 2017)

Figure 7.02g Photodocumentation taken at STA 06+00, facing east (Wilson 2017)

Figure 7.02h Photodocumentation taken at STA 07+00, facing east (Wilson 2017)

Figure 7.02gg Photodocumentation taken at STA 06+00, facing west (Wilson 2017)

Figure 7.02hh Photodocumentation taken at STA 07+00, facing west (Wilson 2017)

Figure 7.02i Photodocumentation taken at STA 08+00, facing east (Wilson 2017)

Figure 7.02j Photodocumentation taken at STA 09+00, facing east (Wilson 2017)

Figure 7.02ii Photodocumentation taken at STA 08+00, facing west (Wilson 2017)

Figure 7.02jj Photodocumentation taken at STA 09+00, facing west (Wilson 2017)

Figure 7.02k Photodocumentation taken at STA 10+00, facing east (Wilson 2017)

Figure 7.02l Photodocumentation taken at STA 11+00, facing east (Wilson 2017)

Figure 7.02kk Photodocumentation taken at STA 10+00, facing west (Wilson 2017)

Figure 7.02ll Photodocumentation taken at STA 11+00, facing west (Wilson 2017)

Figure 7.02m Photodocumentation taken at STA 12+00, facing east (Wilson 2017)

Figure 7.02n Photodocumentation taken at STA 13+00, facing east (Wilson 2017)

Figure 7.02mm Photodocumentation taken at STA 12+00, facing west (Wilson 2017)

Figure 7.02nn Photodocumentation taken at STA 13+00, facing west (Wilson 2017)

Figure 7.02o Photodocumentation taken at STA 14+00, facing east (Wilson 2017)

Figure 7.02p Photodocumentation taken at STA 15+00, facing east (Wilson 2017)

Figure 7.02oo Photodocumentation taken at STA 14+00, facing west (Wilson 2017)

Figure 7.02pp Photodocumentation taken at STA 15+00, facing west (Wilson 2017)

Figure 7.02q Photodocumentation taken at STA 16+00, facing east (Wilson 2017)

Figure 7.02r Photodocumentation taken at the easternmost access point, facing east (Wilson 2017)

Figure 7.02qq Photodocumentation taken at STA 16+00, facing west (Wilson 2017)

Figure 7.02rr Photodocumentation taken at the easternmost access point, facing west (Wilson 2017)

APPENDIX E: BASE DRAWINGS

0′ 20′ 40′

Note: All figures on this page are displayed at this scale

Figure 7.03a Cross-section showing existing conditions, taken at STA 02+70, facing east; Trail path highlighted in yellow; topography courtesy of City of Manhattan

Figure 7.03aa Cross-section showing existing conditions, taken at STA 02+70, facing west; Trail path highlighted in yellow; topography courtesy of City of Manhattan

Figure 7.03b Cross-section showing existing conditions, taken at STA 05+40, facing east; Trail path highlighted in yellow; topography courtesy of City of Manhattan

Figure 7.03bb Cross-section showing existing conditions, taken at STA 05+40, facing west; Trail path highlighted in yellow; topography courtesy of City of Manhattan

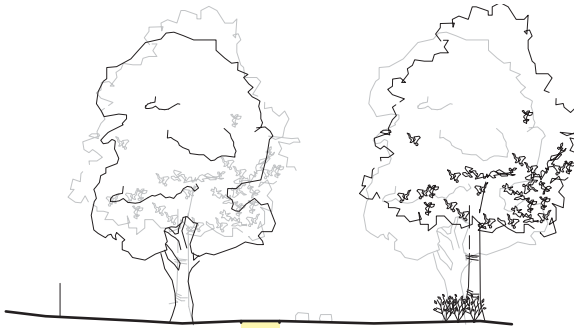


Figure 7.03c Cross-section showing existing conditions, taken at STA 06+70, facing east; Trail path highlighted in yellow; topography courtesy of City of Manhattan

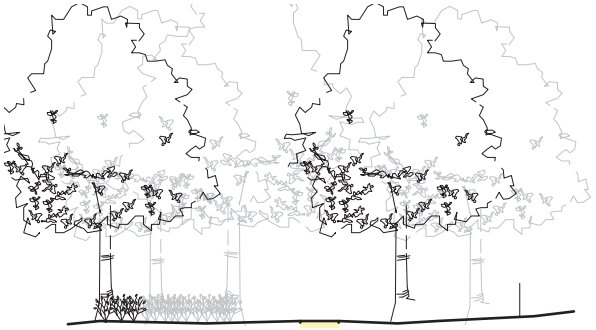


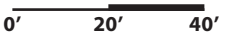
Figure 7.03cc Cross-section showing existing conditions, taken at STA 06+70, facing west; Trail path highlighted in yellow; topography courtesy of City of Manhattan

Figure 7.03d Cross-section showing existing conditions, taken at STA 12+90, facing east; Trail path highlighted in yellow; topography courtesy of City of Manhattan

Figure 7.03dd Cross-section showing existing conditions, taken at STA 12+90, facing west; Trail path highlighted in yellow; topography courtesy of City of Manhattan

Figure 7.03e Cross-section showing existing conditions, taken at STA 14+50, facing southeast; Trail path highlighted in yellow; topography courtesy of City of Manhattan

Figure 7.03ee Cross-section showing existing conditions, taken at STA 14+50, facing northwest; Trail path highlighted in yellow; topography courtesy of City of Manhattan



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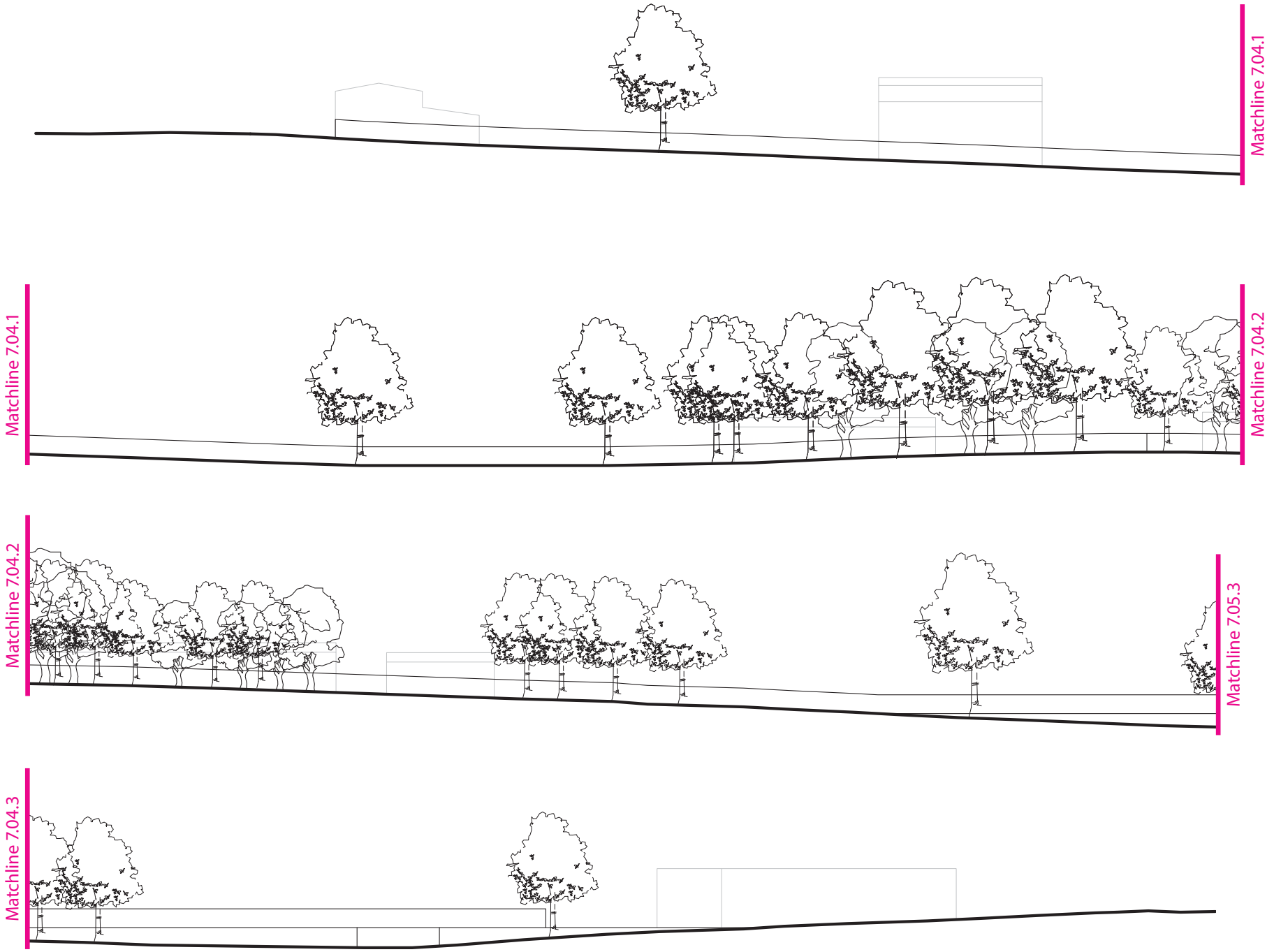


Figure 7.04 South-facing centerline section; topography courtesy of City of Manhattan

0′ 25′ 50′

Note: All figures on this page are displayed at this scale

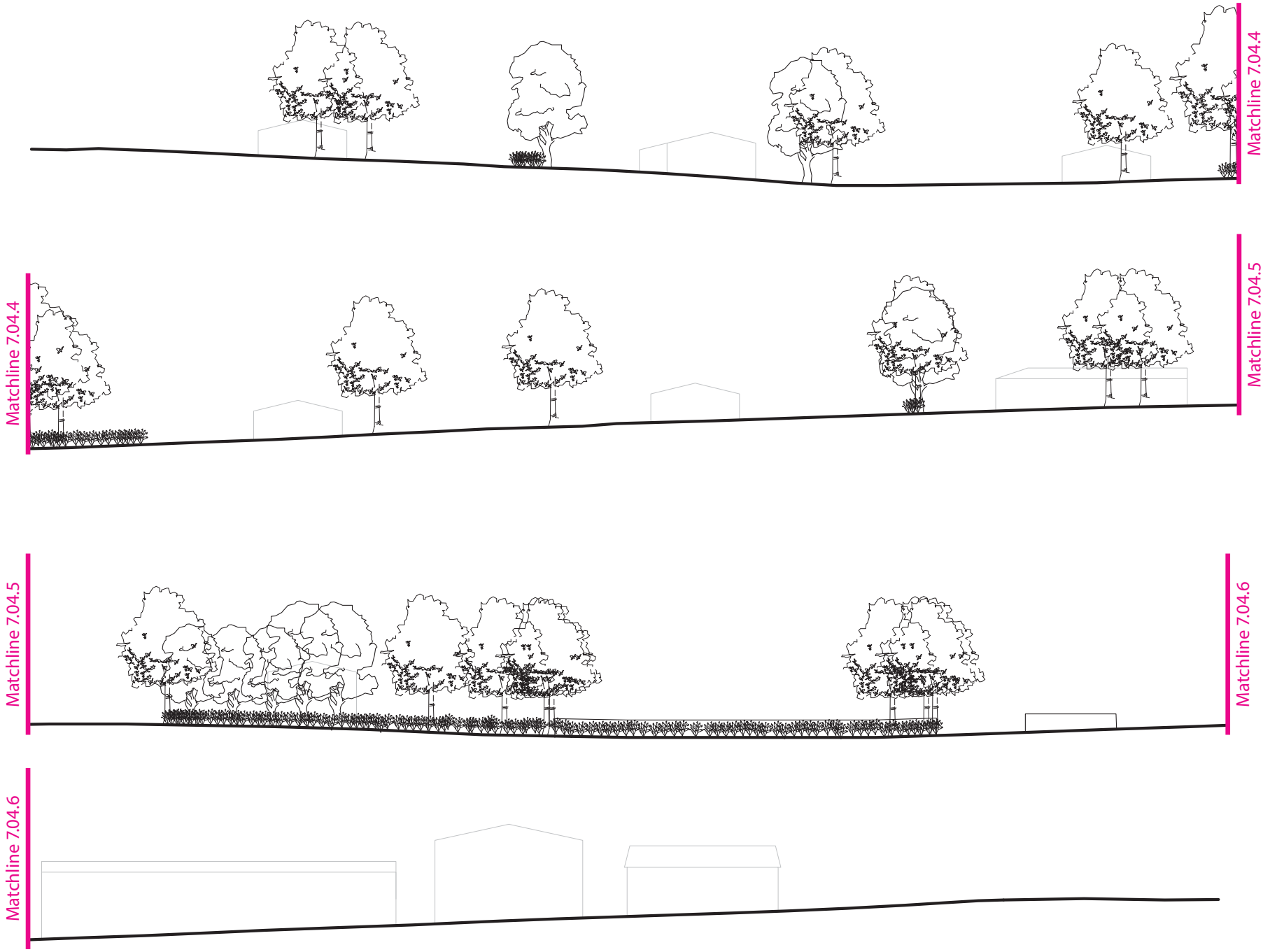


Figure 7.04 South-facing centerline section; topography courtesy of City of Manhattan

0′ 25′ 50′

Note: All figures on this page are displayed at this scale

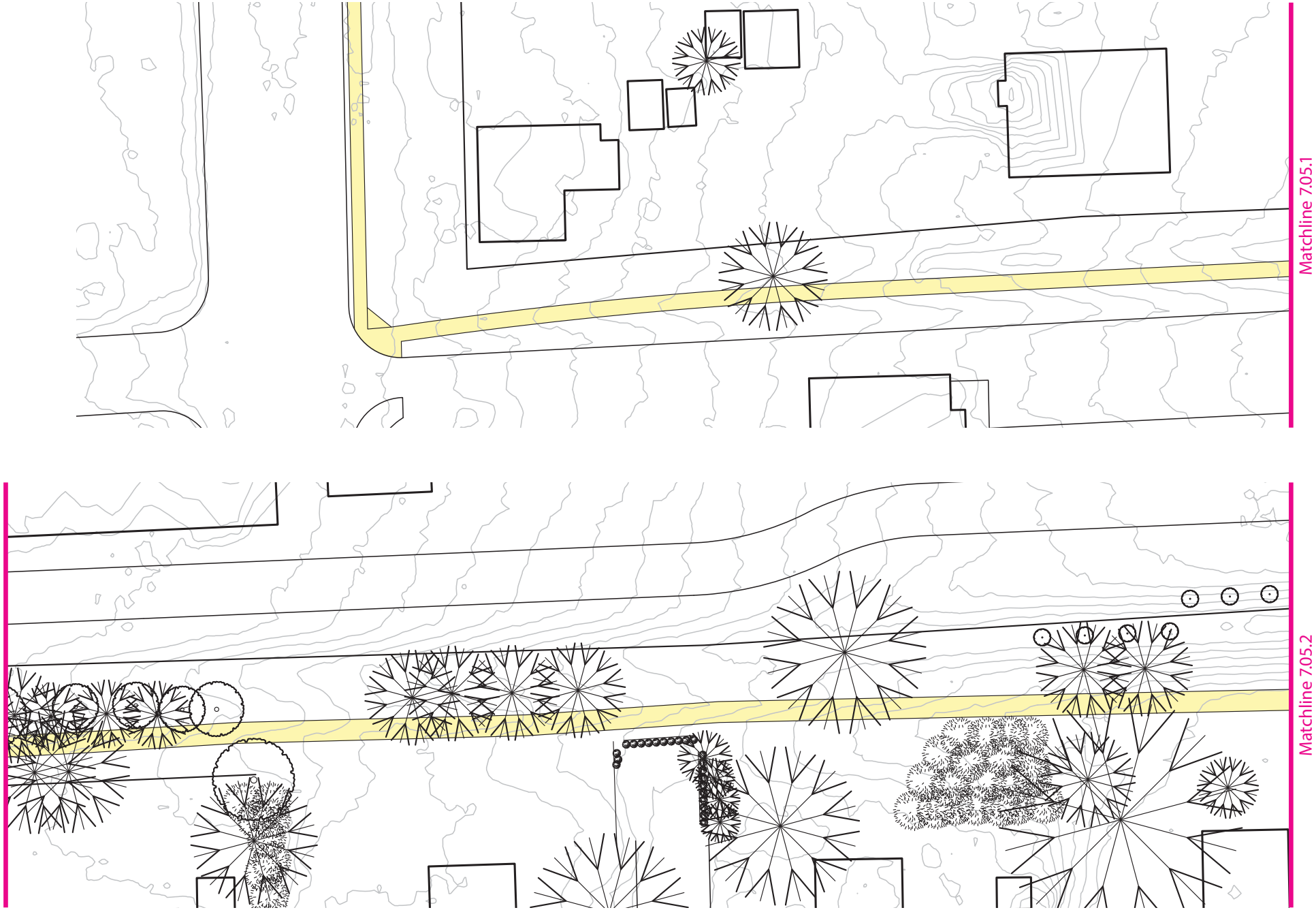


Figure 7.05 Base plan showing existing conditions; Trail path highlighted in yellow; topography courtesy of City of Manhattan

Note: All figures on this page are displayed at this scale

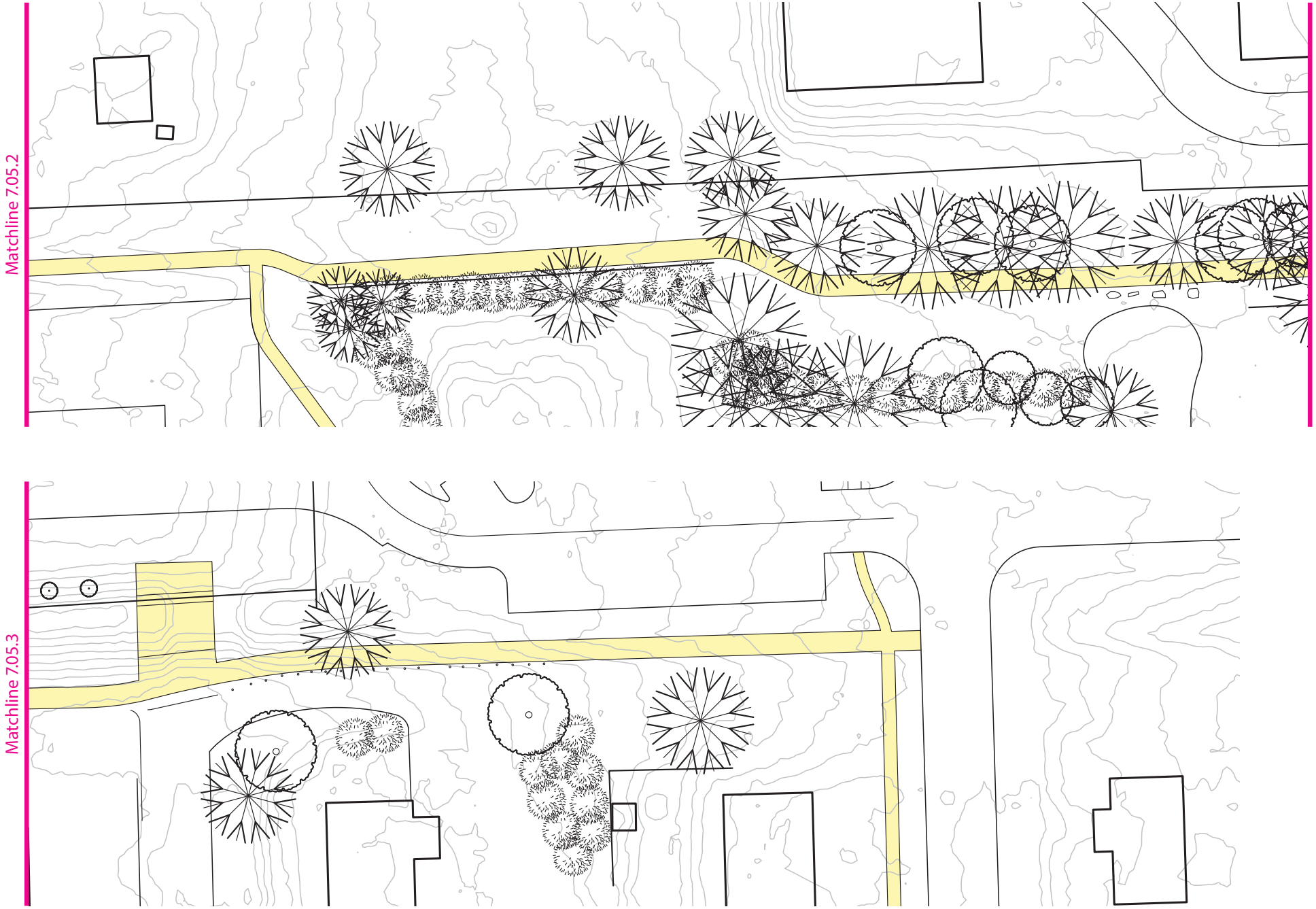


Figure 7.05 Base plan showing existing conditions; Trail path highlighted in yellow; topography courtesy of City of Manhattan

Note: All figures on this page are displayed at this scale

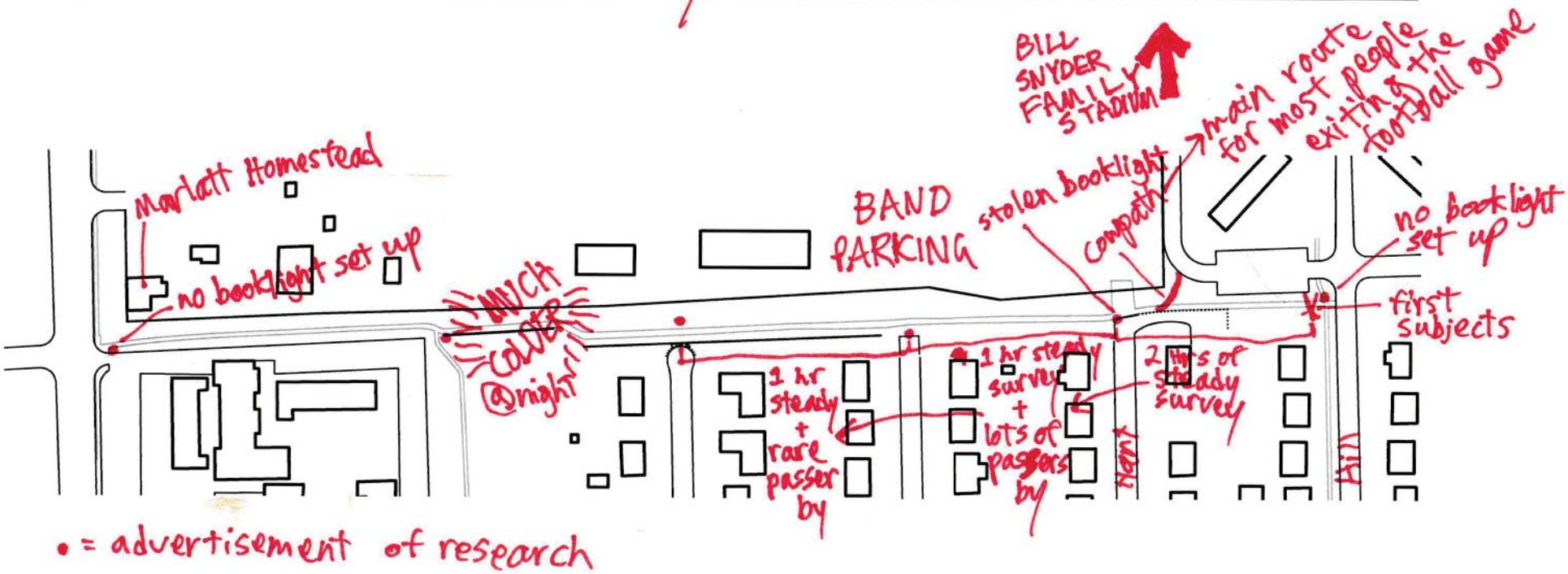
APPENDIX F: SITE & USER OBSERVATION

Note: Some of these observations were later found to be inaccurate. The correct information is given in the Findings chapter.

Figure 7.06 (following pages) Notes taken during site and user observation

Title FIRST INTERCEPT TIME / General site observations

North



Notes

Official start time = ~~4~~ 4:15pm
Official end time = 8:15pm

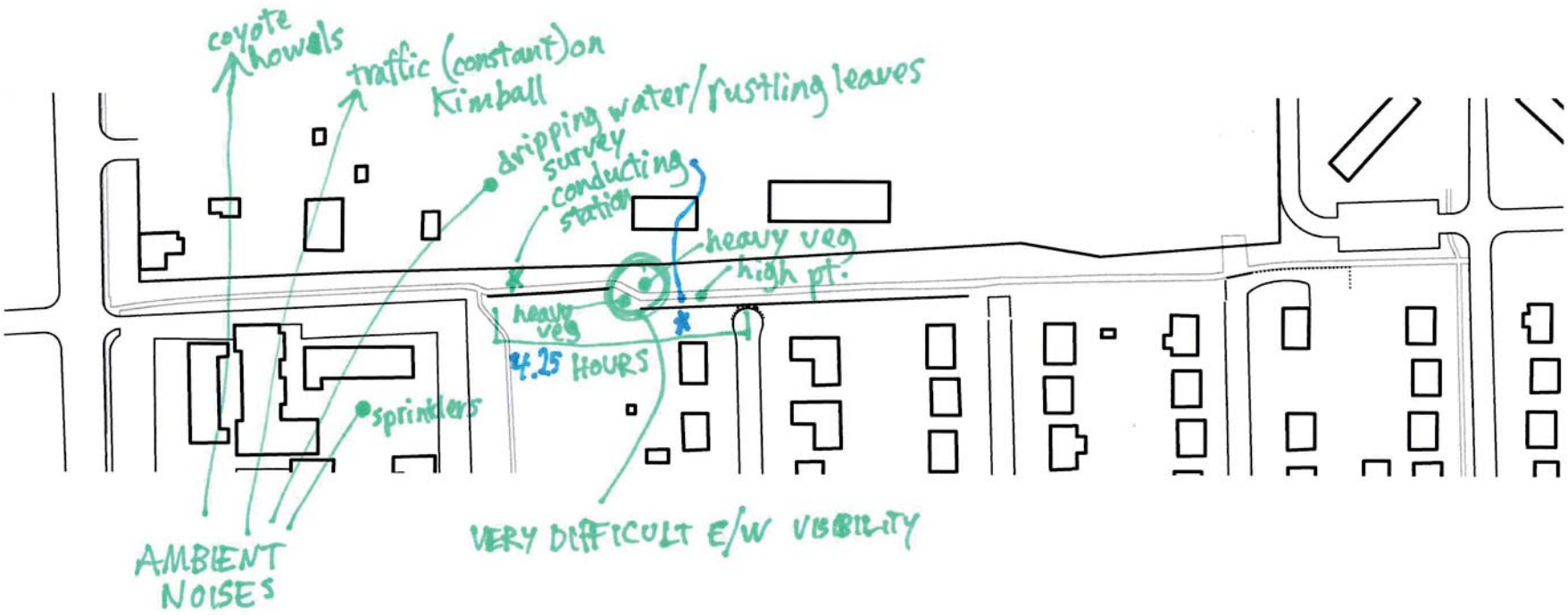
Football game → 2:30 → ~6:30
vs. #22 OKSt
Nat'l Televised Game
Pat Riley Day

catching lots of people b/t Hillcrest & Hartford

recurring comments (verbal):
- add lights
- eliminate erosion
- turn cowpath near Hartford to stairs

Title Second Intercept Time

North



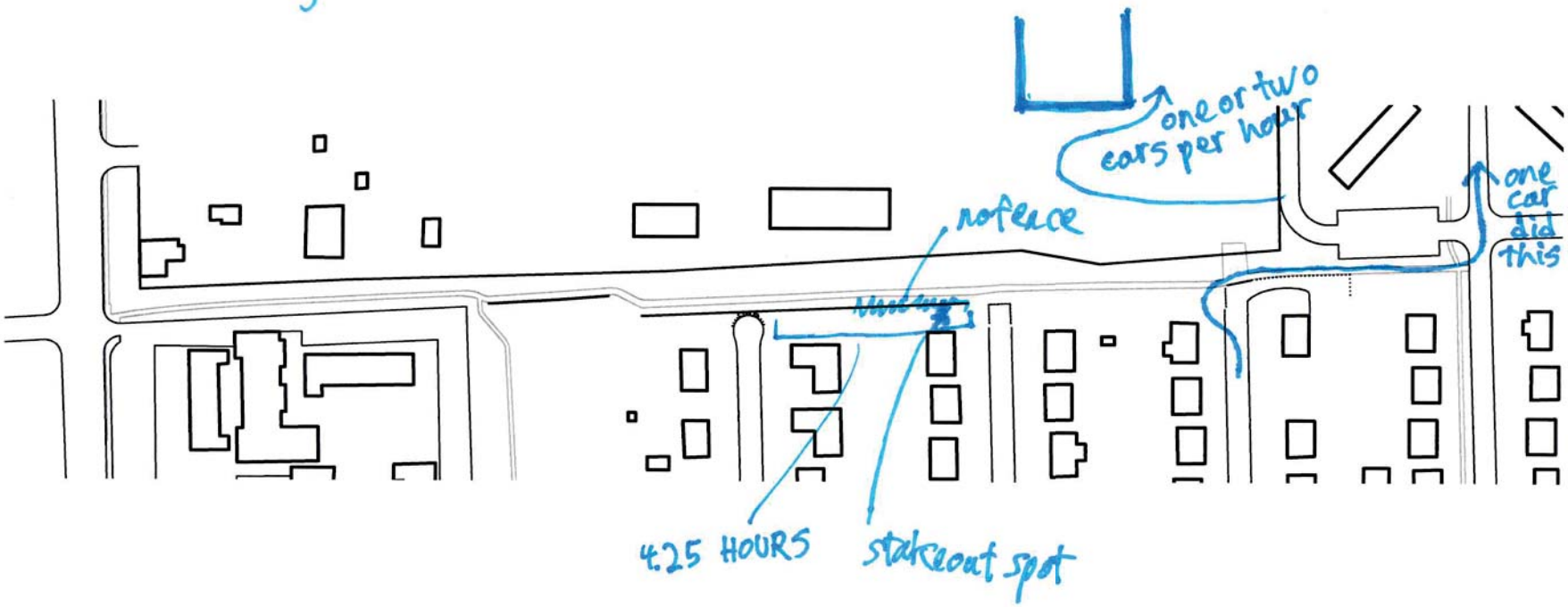
Notes

Official start = 10:15 pm
Official end = 2:00 am

As of 11:15 pm...
8 trail users
- 4 refused
- 3 took survey
- 1 refused then returned to take survey

Title Intercept Survey Time #3
(I'm writing in the dark)

North



Notes

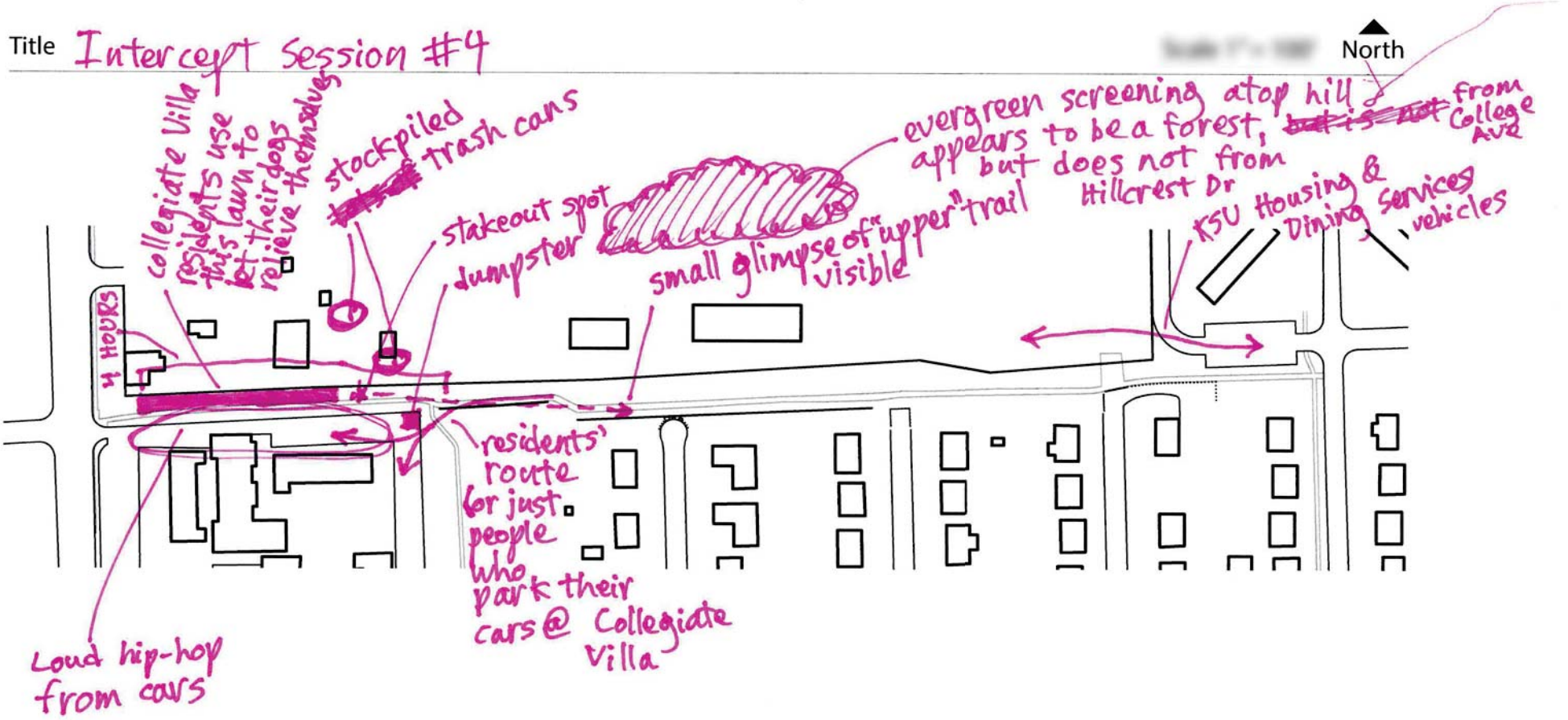
Begin: 6:00pm
End: 10:15

- difficult to ~~see~~ recognize features of passers by more than ten feet away
- silhouettes are difficult until ~100', depending on presence of backlighting

- one user described an account of a previous time using the trail where a man hiding in the shrubs jumped in front of him and indecently exposed himself

- another user refused to remove her gloves in order to take the survey, but stood for 4 minutes roughly to tell me her thoughts about the trail

Title Intercept Session #4



Notes

Begin = 2:00 pm
End = 6:00 pm

- one college-aged woman said her mom ran on this trail when she attended KSU in the 1980s

- upon beginning the survey, several subjects commented on how dark the trail gets at night

- within first hour, every trail user approached took or promised to take survey

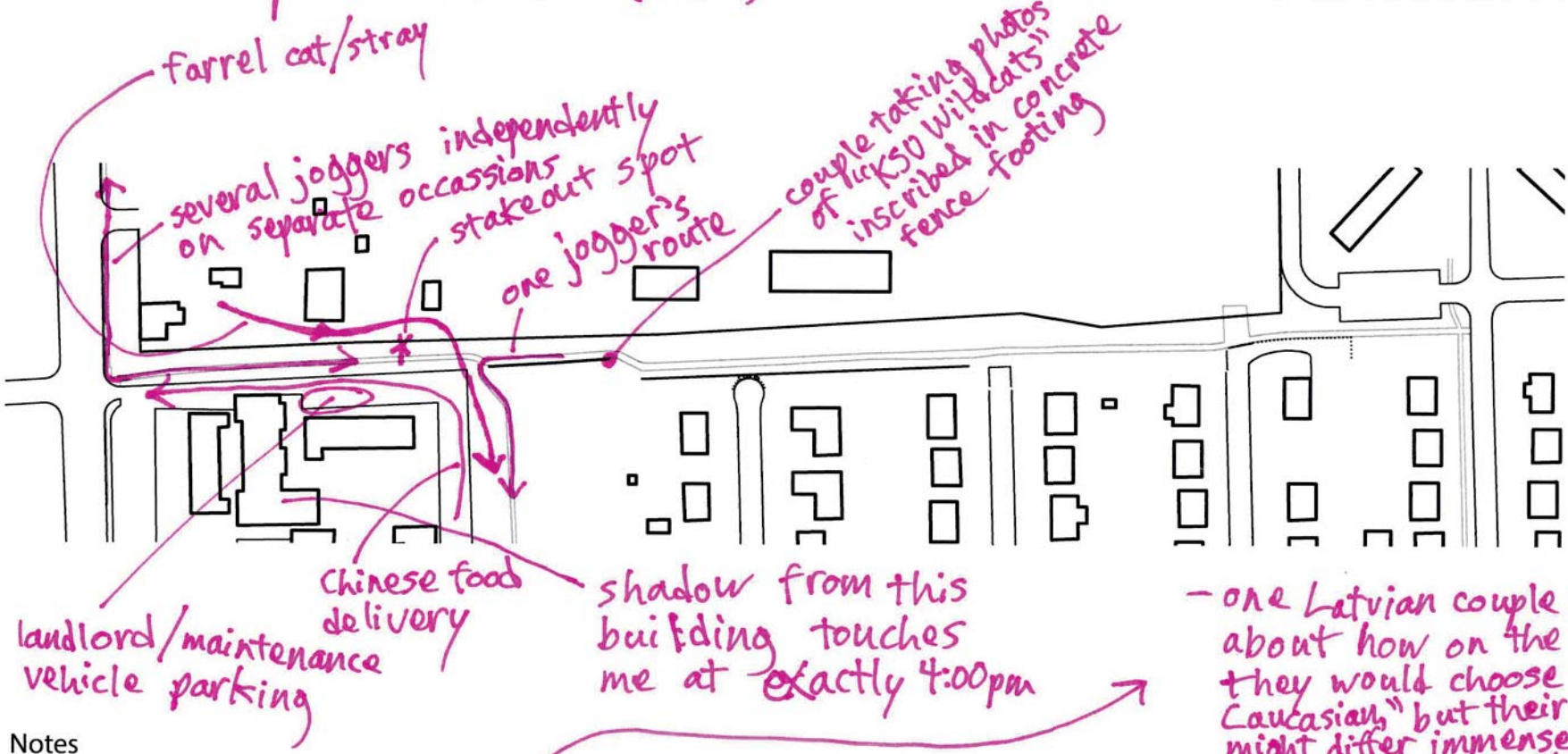
return to take

- primarily students thru first 2 hours of this session

- at least 4 trail users so far have had dogs with them thru first 2 hours

Title Intercept Session #4 (cont'd)

North



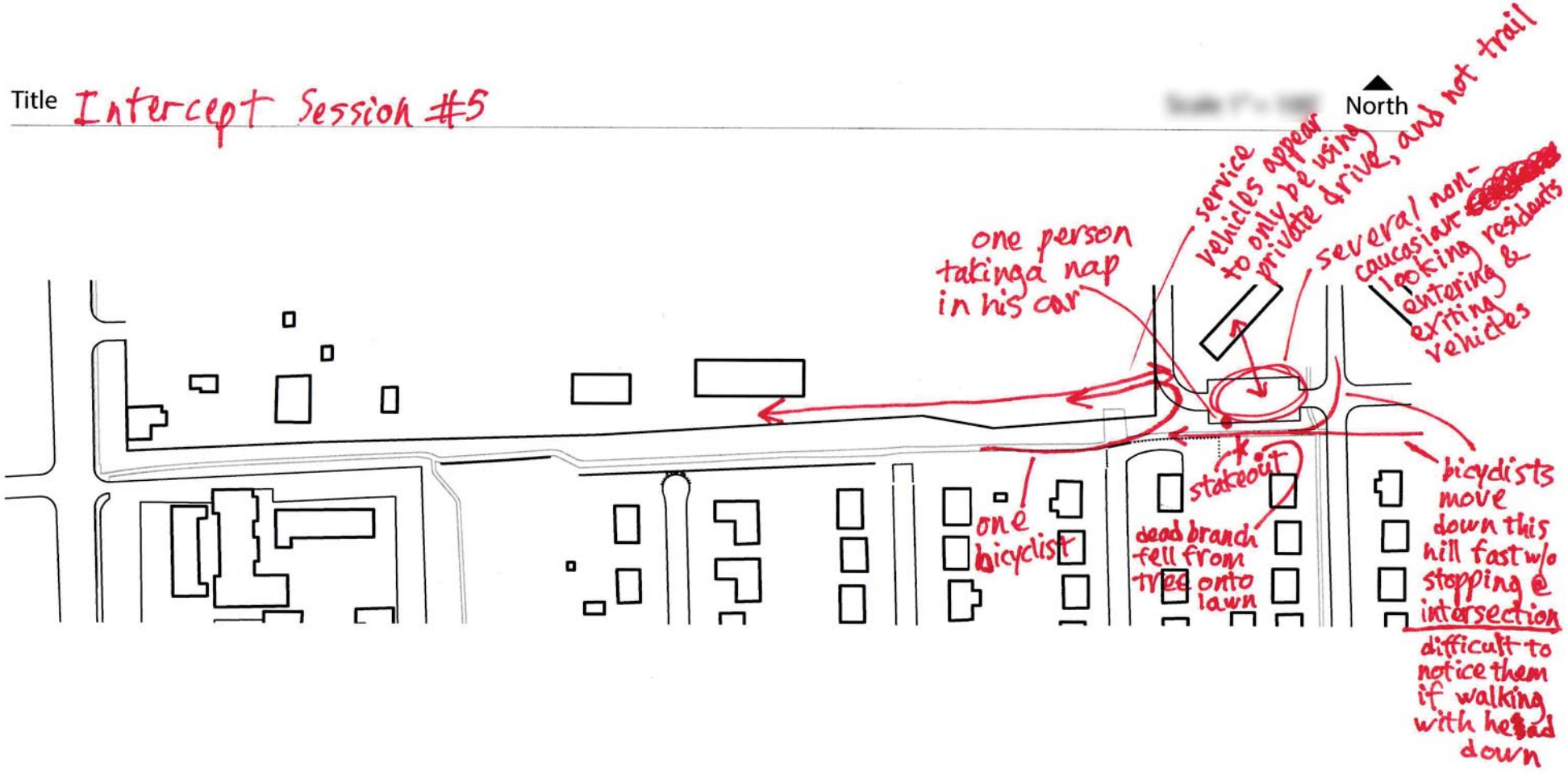
Notes

- a ladybug will land on me maybe once every 20 minutes
- not all trail users who appear to be Caucasian appear to speak fluent English
- many more cars driving around in the Collegiate Villa parking lot around 5-5:30pm than at earlier times in the day
- many more bicyclists than during the previous three survey sessions
- one Latvian couple commented about how on the survey, they would choose "White/Caucasian" but their responses might differ immensely from the stereotypical White American

Recurring comments:

- "I didn't realize this trail had a name." (upon seeing "College-Hillcrest" used in the title of the survey)
- "I can't take the survey because I am going to ___ [destination] to do ___ [activity]."

Title Intercept Session #5



Notes

Begin = 11:00 am

End = 2:00 pm

- windier & feels colder than session #4
- Friday mid-day
- not as many trail users as session #4
- Several users don't speak English, including one participant's father who was visiting from Finland.

Quotes:

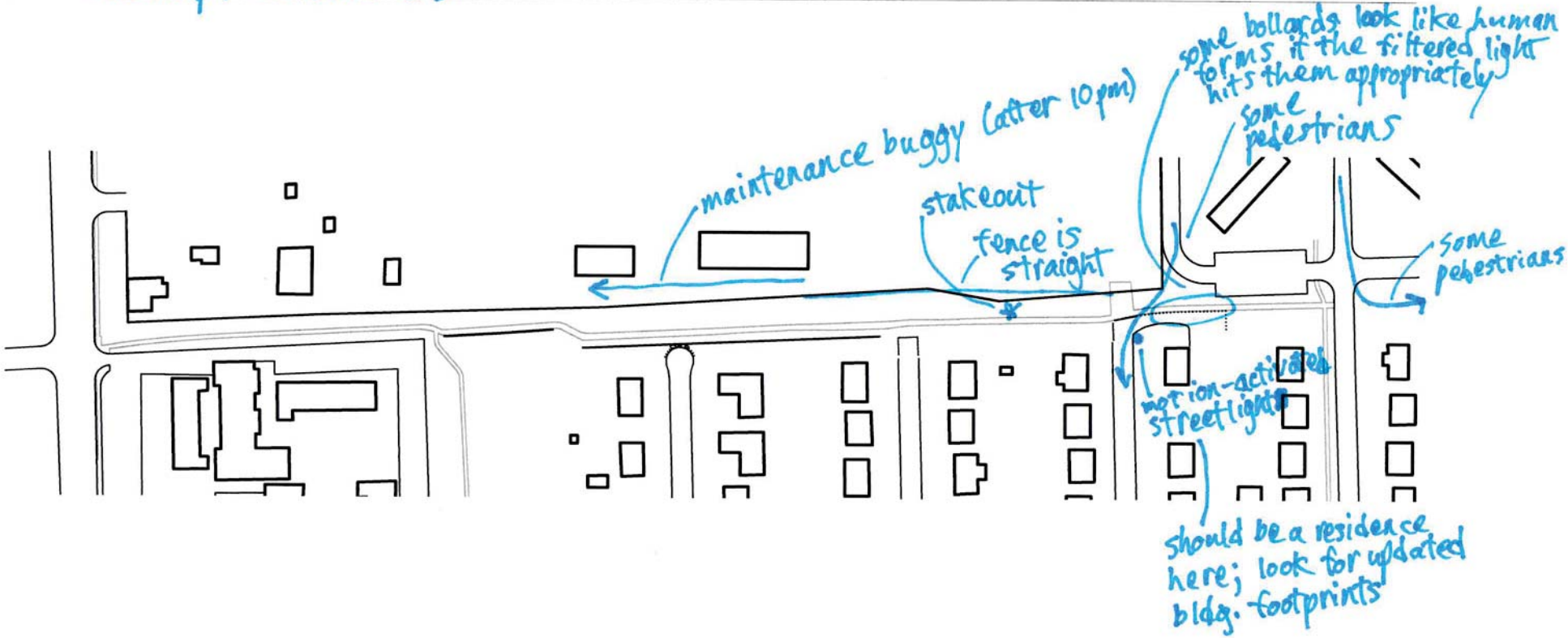
"I like to go as fast as possible through here [on my bike] because it's more of an exercise thing for me... I've hit several animals along here. One was a possum [sic]; another I couldn't tell, maybe like a cat or something. I only know because I felt the bump underneath me."

"This trail is part of the Bill Snyder Half Marathon. I like that much better than [the previous route which didn't utilize this trail]."

"I'm black, but I'm not African-American. I am going to choose 'other.'" ← Liberian

Title Intercept Session #6

North



Notes

Start = 8:15 pm
Finish = 11:00 pm

Friday night
Exhibition Men's Basketball game
- start = ?
- end = ~10:00 pm

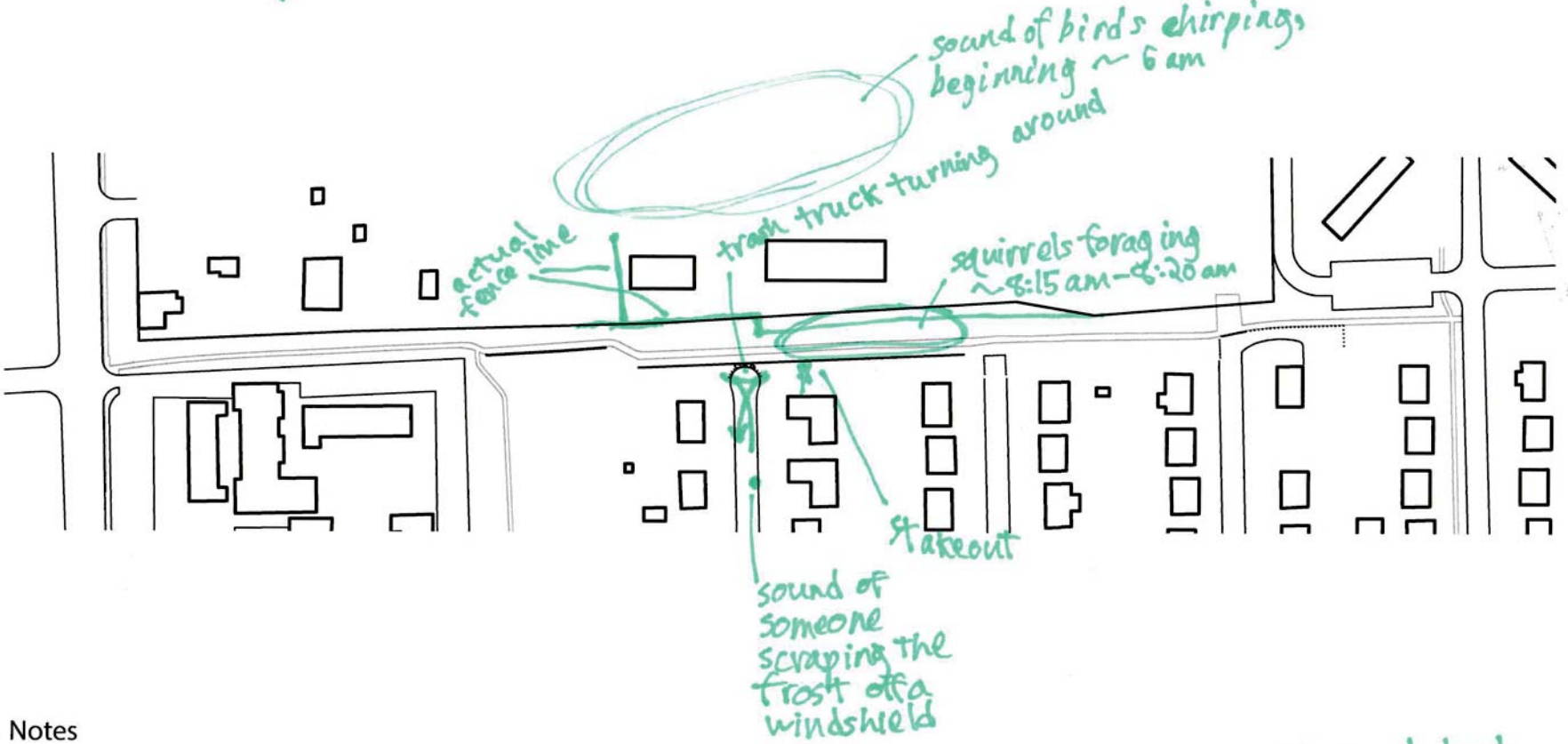
- After 1.5 hours, less than a dozen people have passed by. Roughly half of these people have either already taken the survey or repeatedly declined to take it.

- Around 10 pm, a larger quantity of people entered the trail, but after 10 min, the number decreased to that of before

- Moon is visible & lights the trail well where vegetation is absent.

Title Intercept Session #7

North



Notes

Start = 5:00 am

End = 9:30 am

- Some trail users (all sessions so far) have headphones in, and many take them out in order to take the survey. Of those who I can hear their music once they've removed their headphones, I've counted:
  - 1 country
  - 1 pop
  - 1 hip-hop
  - 2 R&B

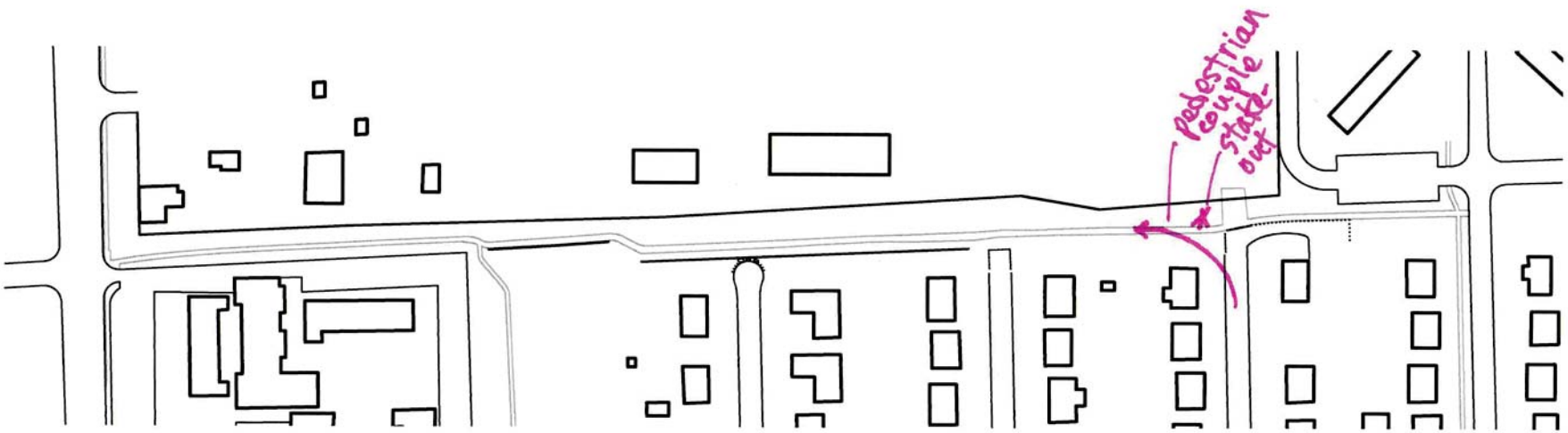
- Excluding those who had already taken the survey or had repeatedly declined to, all trail users who passed by my stakeout except 2 took the survey. These two were female jogging partners who collectively decided not to stop, as they were likely on a timer.

these participants appeared to be African-American

- Forms become visible to the naked eye ~ 1 hr before official "sunrise" and discernable ~ 20-30 minutes before "sunrise."

Title Intercept Session #8

North



Notes

Begin = 1:00pm
End = 4:15 pm

Sat. afternoon
no football game (home or away)

sunny w/ minimal breeze

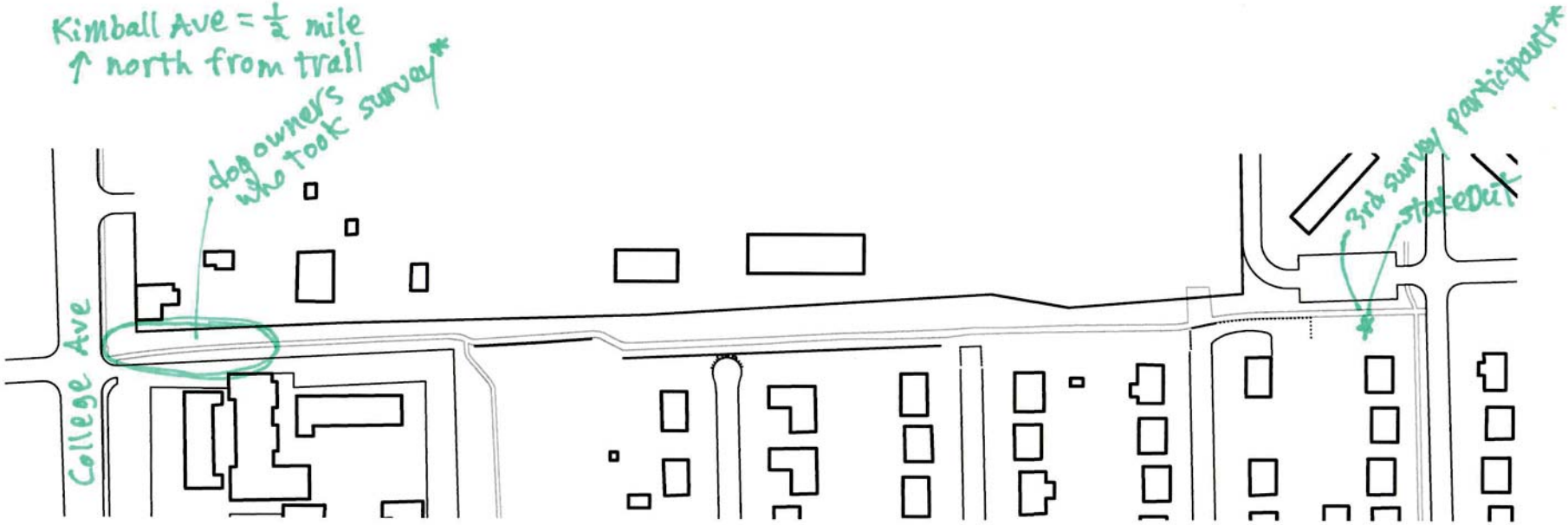
- Many participants (all sessions) want to choose the same response for the first perception question (security cameras and call boxes). They end up choosing ~~one of the~~ the "next safest" or "next unsafest" option instead.

"One of our favorite parts of living here ~~[illegible]~~ is that the trail is so close."
- Young (ish) couple w/ toddler

"When it gets dark, the trail gets scary... I mean, nothing bad has happened to me, but it still feels like it could be."
- young woman, appearing to be African-American, riding a bike

Title Intercept Session #4

North



Notes

Start = 11 pm

End = 2 am

70 trail users ~~were encountered together~~

* 2 people ^ letting their dogs relieve themselves (took survey)

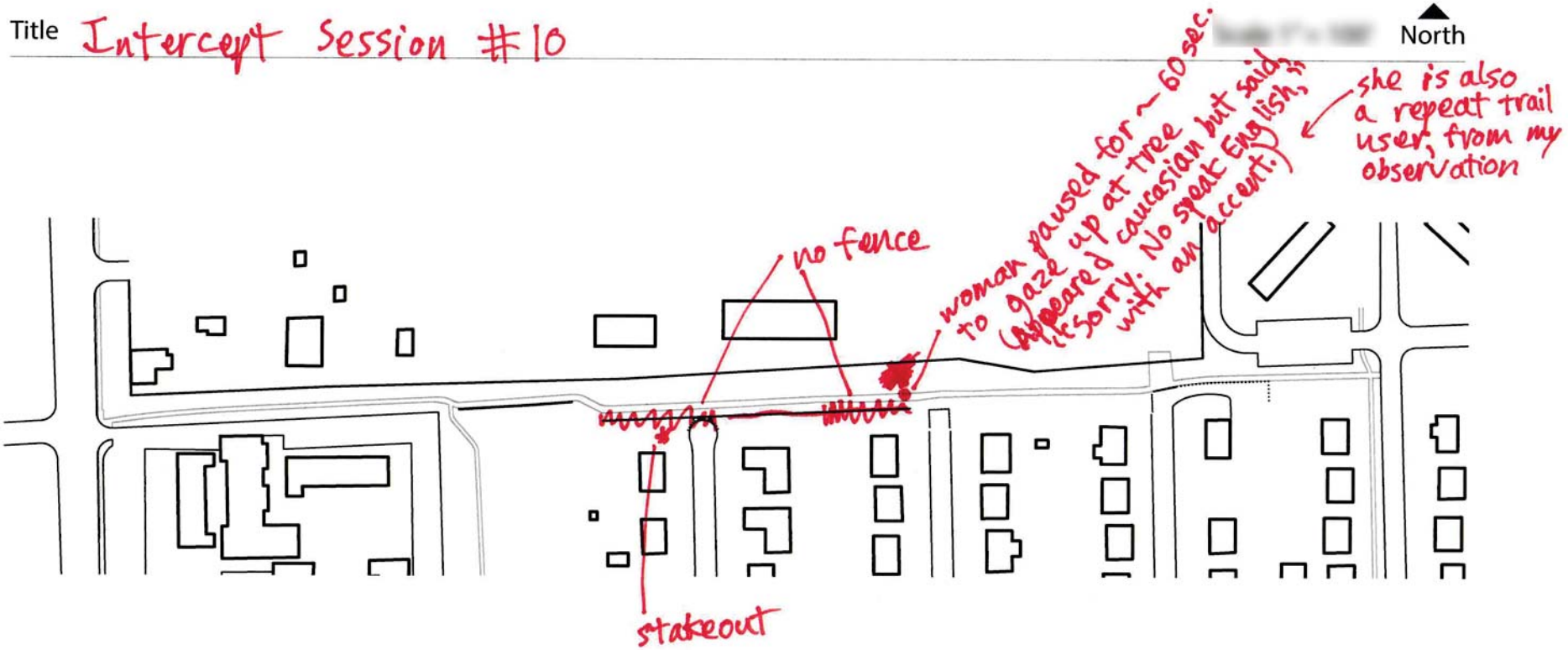
- 1 person who refused to take the survey because of a personal emergency
- 1 person who refused to take survey because it was "too cold" outside
- 1 policeman on a bicycle looking for stolen car suspects last seen at College & Kimball

*1 person who began survey at 2 am

- 1 person who I witnessed walking on trail as I drove away (~2:05 am)

* = took survey

Title Intercept Session #10



Notes

start = 9:30 am
end = 1:00 pm

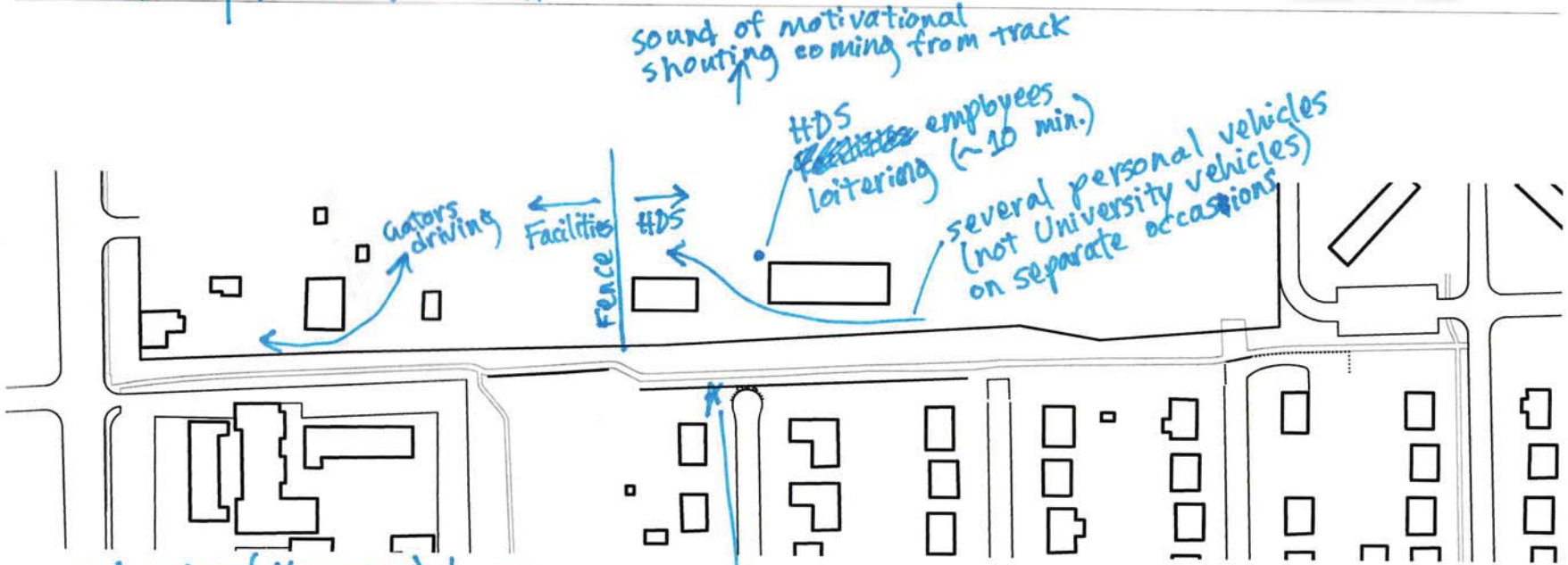
- 3 joggers refused survey in order to maintain pace
- 1 walker refused survey because he was "running late for church"
- 1 man with a large dog, which got very defensive as it approached me, refused survey

"In Switzerland, we have lights along every trail... [regardless of] whether it's the city or the village. Everywhere."

Recurring comments:
- "We definitely need lights along this trail." (While viewing the photo of the security cameras.)

Title Intercept session #11

North



General notes (all sessions):
- several users are on City mailing lists about trails

Notes

start = 9:00 am

end = 11:00 am

primarily bicyclists during first half hour
- includes at least 3 people I've seen on this trail in the last week
- some declined survey and appeared to be in a hurry

- slight increase immediately before 9:30 a.m.
- 9:30 is a standard time for KSU classes to start

All trail users (~20) moving west to east except 3 before 9:30
- 1 bicyclist
- 2 people walking slowly, holding hands (1 male, 1 female)

Appeared to be Middle Eastern. Woman argued that lights should not be implemented, as the current state of the trail encourages wildlife, along with forcing users to refrain from use outside of daylight hours.

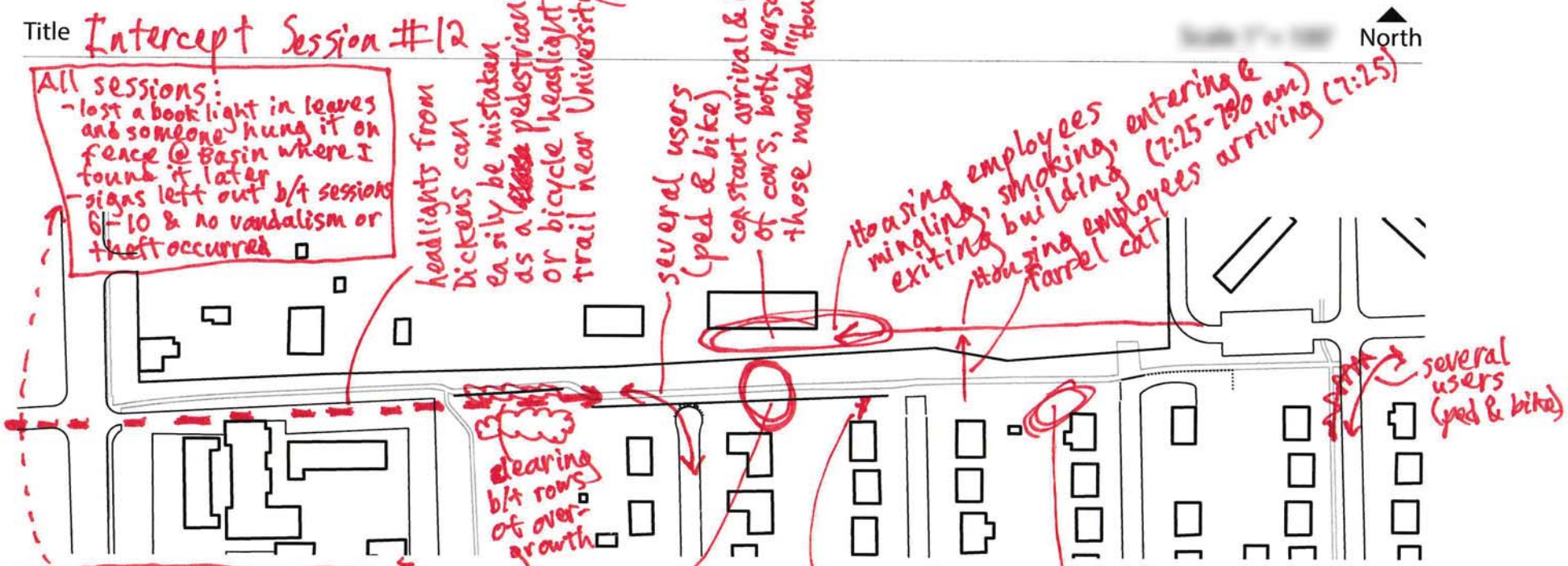
One couple uses this trail to access many things, including:
- shopping
- medical specialist
- parks
- Linear Trail

→ Beginning from Jardine Apts, a standard route for them looks like:
this trail → Dickens Ave → Westport St → Claflin Rd → Wreath Dr → CiCo Park or Linear Trail (with option of taking Linear to Manhattan Ave, then to City Park)

Title Intercept Session #12

North

All sessions:
- lost a book light in leaves and someone hung it on fence @ basin where I found it later
- signs left out b/t sessions 6-10 & no vandalism or theft occurred



All sessions:
- some subjects appear to be A-state athletes by their garb and equipment bags
- some subjects double-take & stop in sight of ground lighting photo

most popular "to get to work" or were in a hurry for other reasons.

squirrels foraging, beginning @ sunrise

several more declined w/o giving reason

Notes

start = 5 am

end = 9 am

supermoon (first since 1940s?; also over weekend?)

- 11 trail users refused survey as they needed to get to work
- 13 trail users claimed to have already taken survey.
- 2 people were riding their bike so fast I could not react quickly enough to ask about the survey.

Quotes:

- "You should take some of those lights (points at lantern in my hand) and put them up on poles along this trail so that people feel safer... You should put some music too. Then everyone would enjoy being out here. They'd be dancing; it would be fun."
  — man using trail at ~5:30, appeared to be African-American & in his 20s

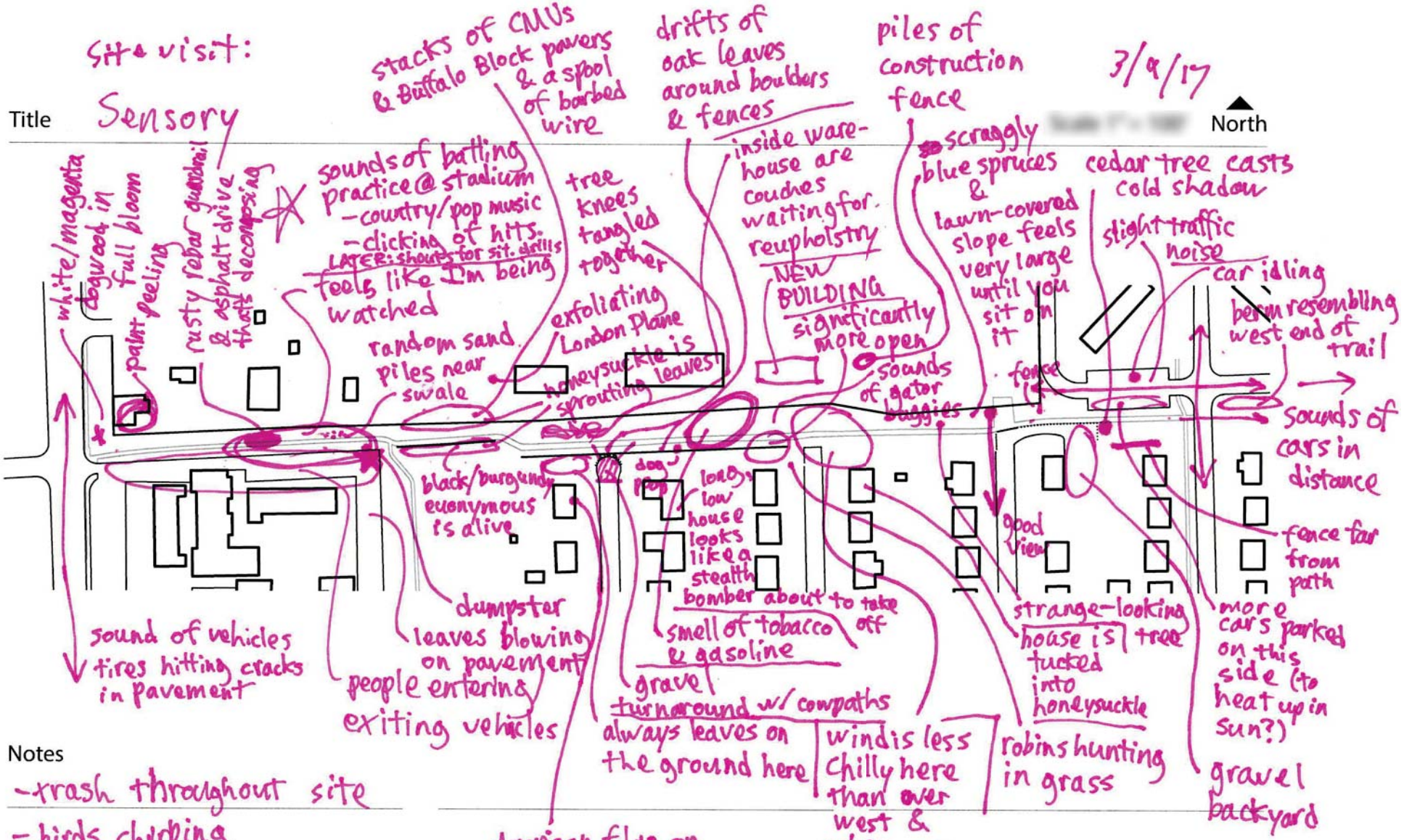
- "One of the reasons we choose [this neighborhood] is because of the trail... I feel safe here, but I am a guy... I have a wife and a daughter. I will choose [on the survey] that I feel unsafe so that you put lights along it. I want them to be safe... [My daughter] is 14 years old."
  — man appearing to be Caucasian

Site visit:

Title Sensory

3/9/17

North



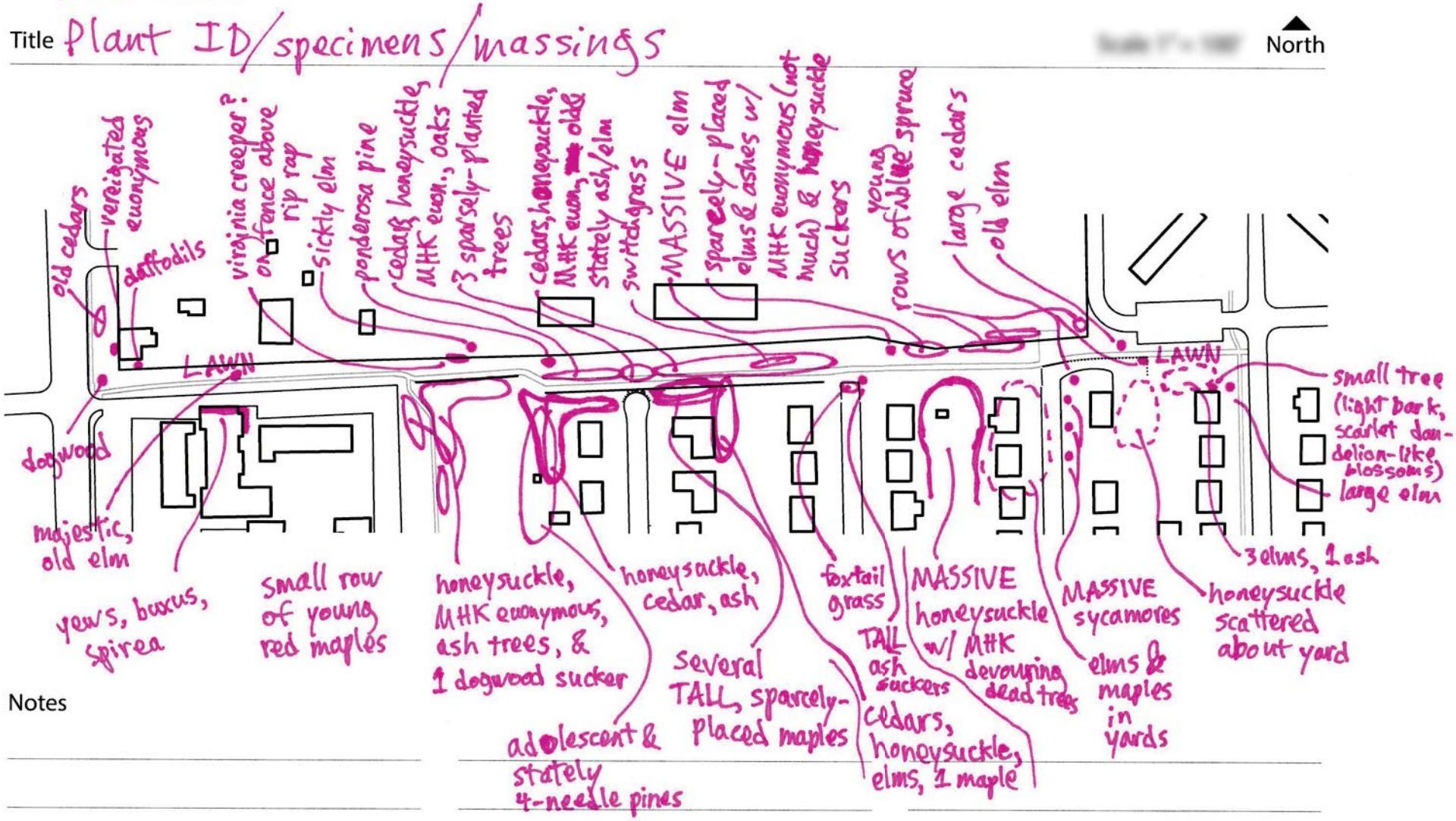
Notes

- trash throughout site
- birds chirping
  - hawks
  - songbirds
  - woodpecker
- smell of grilling wafting w/ wind from Jardine Y toward Pipher
- moped w/ two people on it almost hit me near dumpster
- no benches anywhere

Site Visit:

Title Plant ID/specimens/massings

North



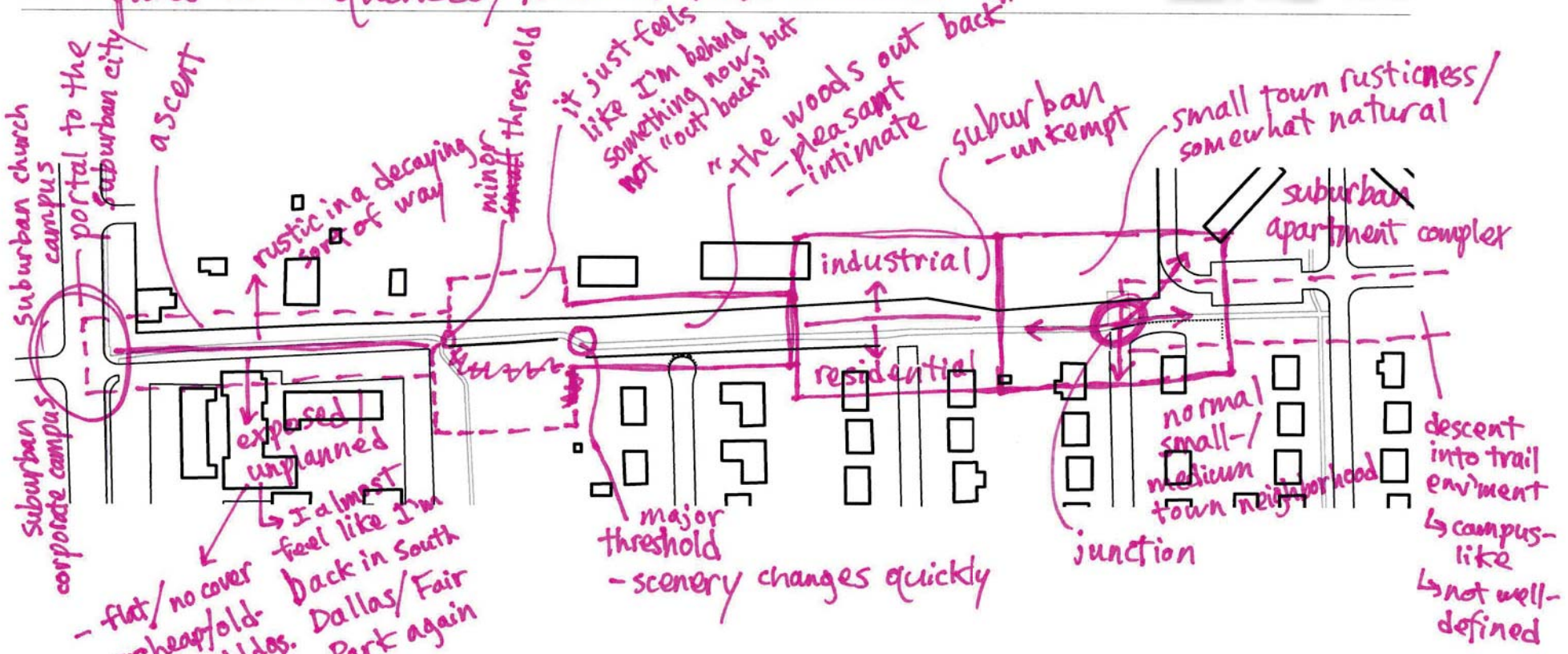
Notes

Site Visit:

3/9/17

Title Spaces & Sequences/Mental Associations

North



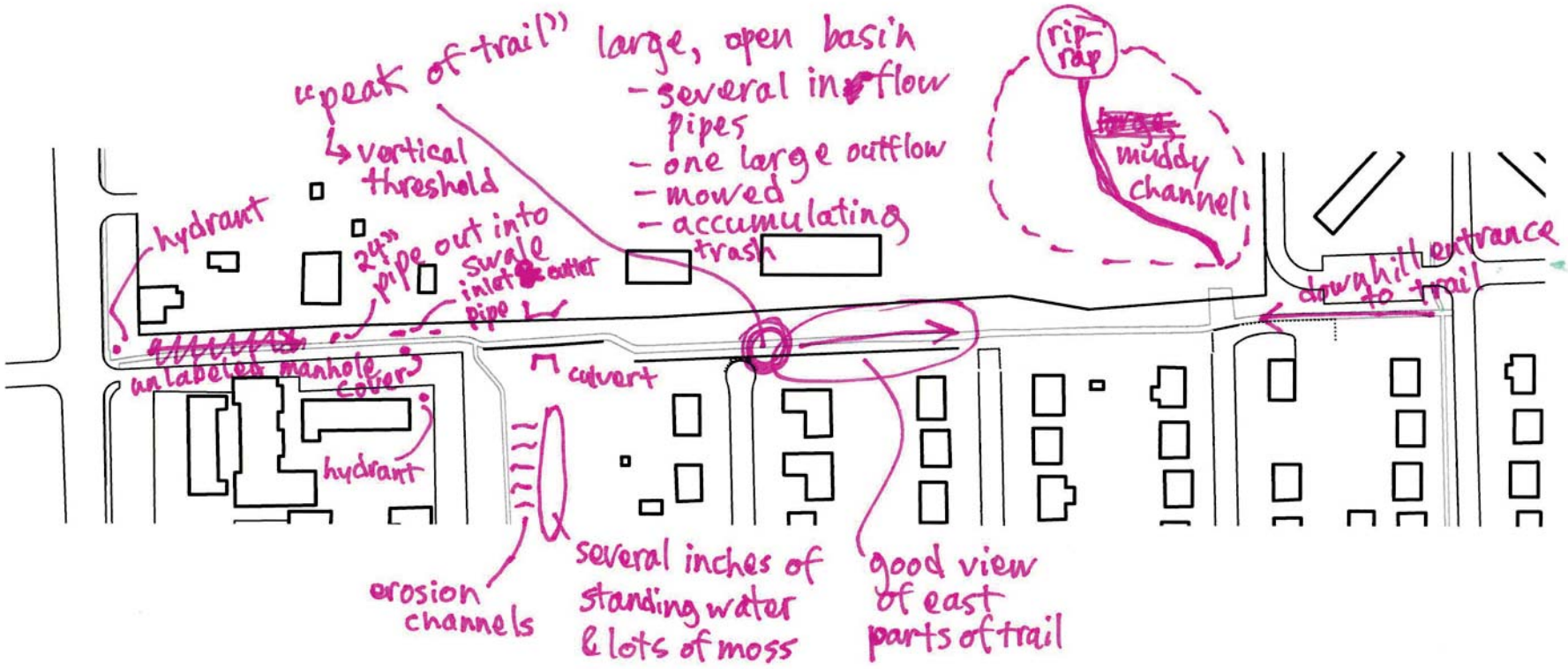
Notes

site visit:

3/9/17

Title Water Bodies/Landforms

North



Notes

APPENDIX G: SITE HISTORY

From its rural beginnings to its current urban conditions, the location, development, and stakeholders of the Trail have all played significant roles in the development of this part of Manhattan and the University campus. Several traces of the Trail's history remain both on and off the study site. The following timeline details the events and development patterns which have influenced the form and culture of the Trail environment as it exists today.

Please note that in this appendix, "the study site" is used to refer to "the Trail" in descriptions that either precede or do not include the physical trail.

1820–1855

Several early residents of the area form Blue Mont College Association, and buy 160 acres immediately southwest of the study site (BLM 2016; KSU Archives 2017). The town of Bluemont begins to develop on and around this land (KSU Archives 2017).

CIRCA 1855

The Scrip/Warrant Act of 1855 is passed, reimbursing soldiers from the Old Indian Wars through the War of 1812 with land in the Bluemont area. As a result, the families of three New England militiamen are each given 160 acres on the study site and to the northwest (BLM 2016; KSU Archives 2017; NARA 2010).

LATE 1850s

Washington Marlatt, an educated and headstrong Methodist preacher, travels the Oregon Trail (KSU Archives 2017; NPS 2017) during the height of Bleeding Kansas. He is in his late twenties and travels by foot. Along the way, he comes to the conclusion that in order to survive on the plains, he would need to learn to farm and therefore America needs a college which teaches agriculture. In Bluemont, he meets several people who shared this vision. Due to his unwavering spirit, willingness to invest, and eagerness to do physical labor himself, construction of Bluemont Central College begins nearly immediately (KSU Archives 2017).

CIRCA 1860

Bluemont Central College opens and Marlatt becomes its principal (Compass 1986; KSU Archives 2017). At about this time, Marlatt builds a house immediately north of the study site (O'Brien and

KSHS 2006) and subsequently goes broke (KSU Archives 2017).

1860s

Desiring a simpler life, Marlatt resigns from preaching and academic administration to focus on his recent marriage and his farm (KSU Archives 2017). The Morrill Act is passed at about this same time and Bluemont Central College becomes Kansas State Agricultural College, the first land-grant institution in America (Compass 1986; O'Brien and KSHS 2006).

1870s–1880s

Manhattan Town Association (located where today's downtown is) and Bluemont Town Association are consolidated (KSU Archives 2017). Due to the rocky soil on the Bluemont hill, KSAC relocates to the current KSU campus (Glasgow 2014), where the soil is much more fertile. This move increases the success agricultural research immensely. Pine trees were removed from the original Bluemont Central campus to be used experimentally on the KSAC campus. As of February 2017, one of these trees still exists to the east of Seaton Hall, the future location of the College of Architecture, Planning, and Design (Compass 1986).

Marlatt hires a friend to deconstruct the former Bluemont Central building and construct a barn behind his house out of the materials. This barn still exists today. Possibly the only structural material member which has been tampered with on the barn is the engraved limestone door crosshead. This piece currently serves as the fireplace mantle in the KSU Alumni Center (Glasgow 2014; O'Brien and KSHS 2006).

J.S. Hougham, KSAC's first agriculture professor (Hight 2017), buys land adjacent to Marlatt and the old Bluemont campus (KSHS 1881, 67).

CIRCA 1880s–1900s

Hougham's land is divided among his children. Judging by a 1909 plat book, it appears that one child was given the land which is now Pipher and its related parcels and another was given the land that is now Hartford and Hillcrest and their related parcels (KSHS 1909, 58).

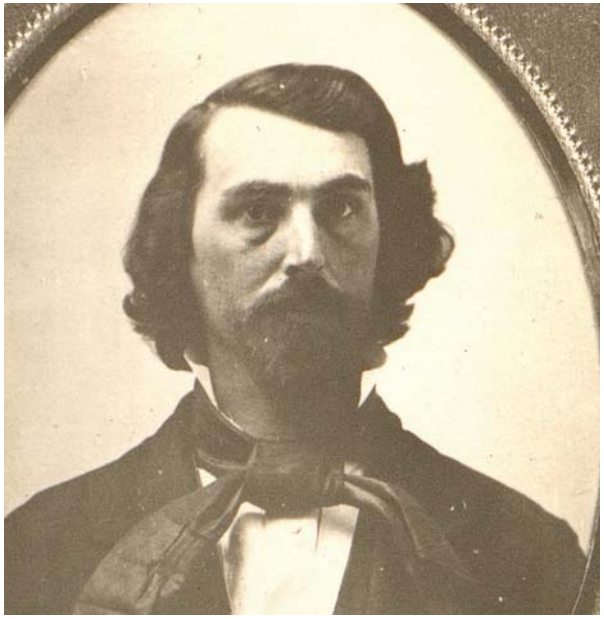


Figure 7.07 Washington Marlatt (Courtesy of KSU Archives, n.d.)

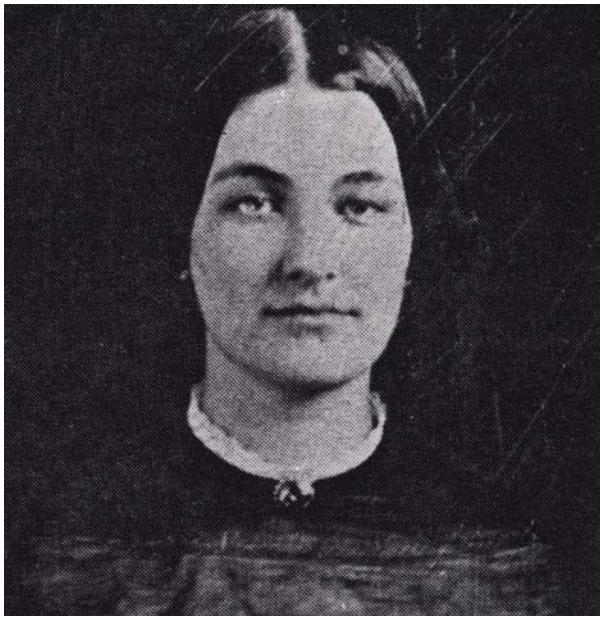


Figure 7.08 Julia Marlatt (Courtesy of KSU Archives, n.d.)

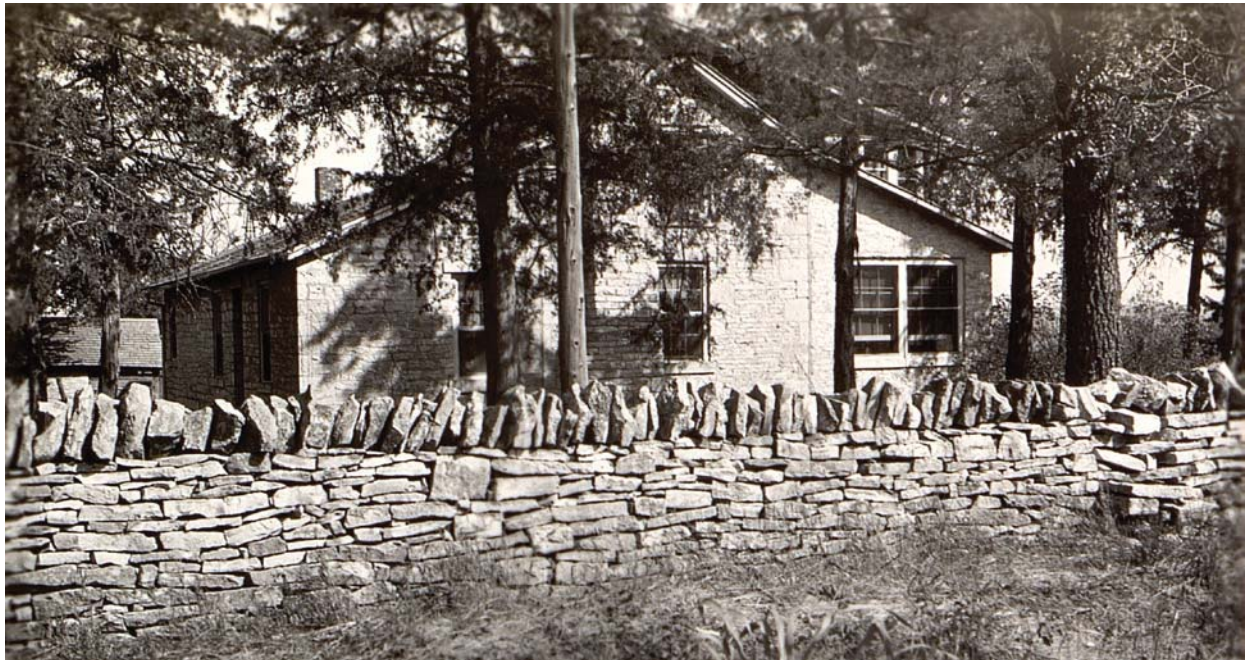


Figure 7.09 Former Marlatt farmstead, seen here as the KSU Animal Husbandry building; taken facing southeast from College Avenue (Courtesy of KSU Archives, 1936)

Figure 7.10 Former Marlatt farmstead, seen here at present day; taken facing northwest from Trail; Landscape Services staging can be seen in the foreground at right

1909–1910s

Marlatt passes away, giving the land to his children (KSU Archives 2017). By 1918, KSAC obtains ownership of the Marlatt farmstead (Hight 2017).

CIRCA 1920s–1940s

The former Marlatt farmstead becomes KSAC's Animal Husbandry Facility (***Animal Husbandry Farmhouse*** 1936). A gravel farm road is laid between the north and south plats, separating them and connecting College Avenue to Denison Avenue (***Aerial Photograph of Manhattan*** 1950).

1950s–PRESENT

Modifications are made to the Marlatt farmstead by KSU Facilities employees to serve utilitarian functions (O'Brien and KSHS 2006; Taussig 2017).

1960s

Manhattan grows north and west until it nearly reaches the study site. The Campus Acres development is constructed. Houses do not yet extend west of Pipher. The westernmost two buildings of Collegiate Villa are constructed. KSU's Jardine Apartments are also constructed. They do

Figure 7.11 Aerial perspective of Manhattan in the 1950s; taken facing northwest; Trail site is highlighted in yellow (Aerial photograph courtesy of the Riley County Historical Society & Museum, 1950)

not yet extend west of Hillcrest. The farm road on the study site is rerouted during this development period to the route of today's Trail. At this time, a shelterbelt begins to thicken where the road bends south, separating University and private property. This shelterbelt is the north vegetation of today's "Tunnel" (*Aerial Photograph of Manhattan* 1962). Traces of this property line are still evident along the Trail in the form of two orange rebar fence posts, one of which still has barbed wire attached to it.

EARLY–MID-1970s

Two KSU studies and a grant application are written to develop and fulfill a comprehensive bicycle network master plan in Manhattan. These documents emphasize significant use of e study site as a part of the local circulation network (Jasper 1977; Bailey et al. 1976; Lacey 1974).

LATE 1970s

As a financial response to the OPEC Oil Crisis (1973-1974), Manhattan forgoes construction of a street to connect Dickens Avenue and Jardine Drive. Instead, a concrete trail is poured. This is the same trail that exists on the study site today. The Trail also provided an alternative route for a growing amount of bicycle traffic throughout Manhattan (Bailey et al. 1976; Intercept survey participants 2016; Taussig 2017).

MID-1960s–1980s

The KSU Athletics complex is developed on the former site of the Marlatt farmstead (*Aerial Photograph of Manhattan* 1962; KSU Athletics 2017; KSU Athletics 2017a). KSU constructs all Jardine buildings west of Hillcrest, including Building Y which faces the study site. Collegiate Villa constructs its easternmost three buildings. University Drive is laid out, paved, and developed with housing (*Aerial Photograph of Manhattan* 1986). It is difficult, however, to tell how many of these physical developments were constructed before the Trail was constructed and how many occurred after the Trail was constructed.

CIRCA 1995–FUTURE

KSU Parking Services, HDS, and Athletics facilities and related infrastructure north of the Trail, east of STA 6+80 are developed (*Aerial Photograph of Manhattan* 1995). This includes the 2016 redevelopment of the Athletics complex to include a soccer stadium per Title IX requirement.

CIRCA 2007

Jardine begins its reconstruction master plan (*Aerial Photograph of Manhattan* 2006; *Aerial Photograph of Manhattan* 2008). Collegiate Villa completes its sixth building (Google Inc. 2007).

CIRCA 2011

Vegetation along the Trail is thinned, including the former shelterbelt. The drainage basin to the north of the site and related 100-year overflow channel are constructed (revealed through multiple informal interviews).

2015–2017

The City/University Special Project Fund authorizes $100,000 to implement lighting improvements along the Trail (Mangus 2017; Taussig 2017).

"Dr. Pat (Patricia) O'Brien has written a proposal to use the Marlatt house and barn as a museum devoted to land grant universities" (Glasgow 2017).

This study began in August 2016. It was published in May 2017.

Figure 7.12a Trail site in 1962; path outline is superimposed in yellow (aerial photograph courtesy of KSU Metadata, Preservation, and Digital Initiatives, 1962)

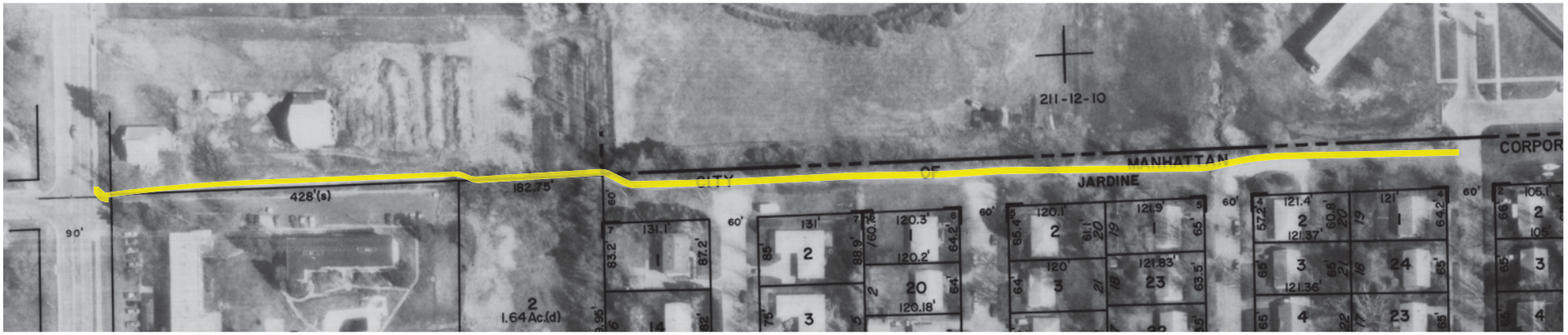


Figure 7.12b Trail site in 1986; path outline is superimposed in yellow (aerial photograph courtesy of City of Manhattan, 1986)

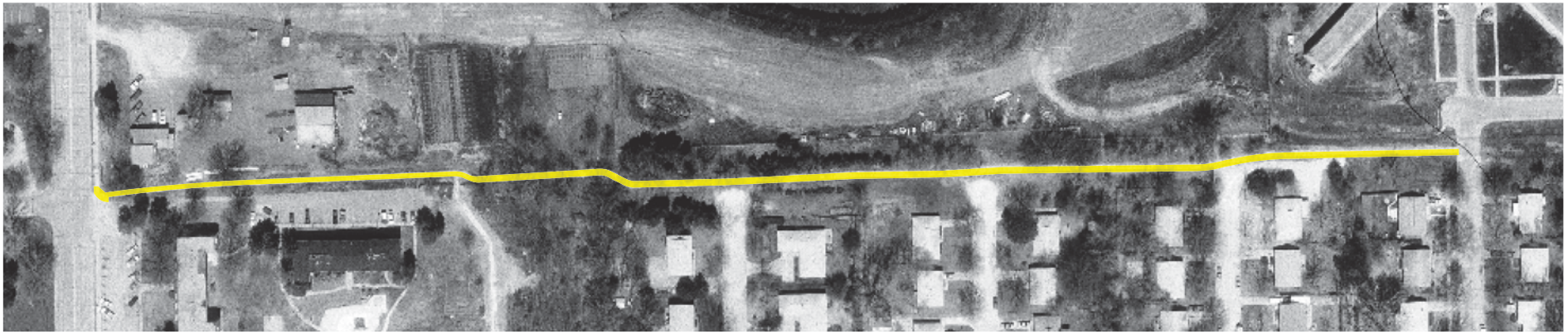


Figure 7.12c Trail site in 1995; path outline is superimposed in yellow (aerial photograph courtesy of City of Manhattan, 1995)

Figure 7.12d Trail site in 2004; path outline is superimposed in yellow (aerial photograph courtesy of City of Manhattan, 2004)

Figure 7.12e Trail site in 2011; path outline is superimposed in yellow (aerial photograph courtesy of City of Manhattan, 2011)

Figure 7.12f Trail site in 2016; path outline is superimposed in yellow (aerial photograph courtesy of City of Manhattan, 2016)

APPENDIX H: ADDITIONAL GIS DATA

Note: All figures in this appendix not to scale.

The following data was gathered during the correspondence portion of the study. All figures not to scale.

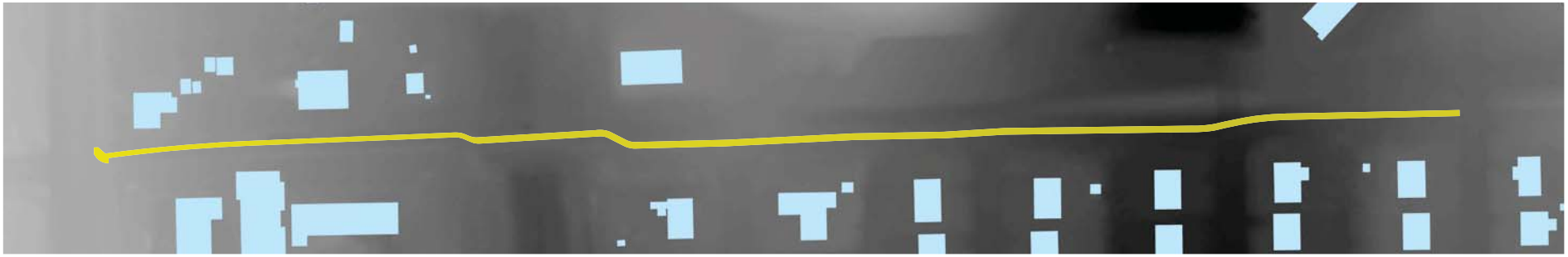


Figure 7.13 DEM of the Trail and context; lowest elevations are shown in black and higher elevations are shown in white; buildings are superimposed in blue and Trail is superimposed in yellow (adapted from Guarneri 2017)

Figure 7.14 Property lines of the Trail and context shown in black; Trail is superimposed in yellow (adapted from Guarneri 2017)

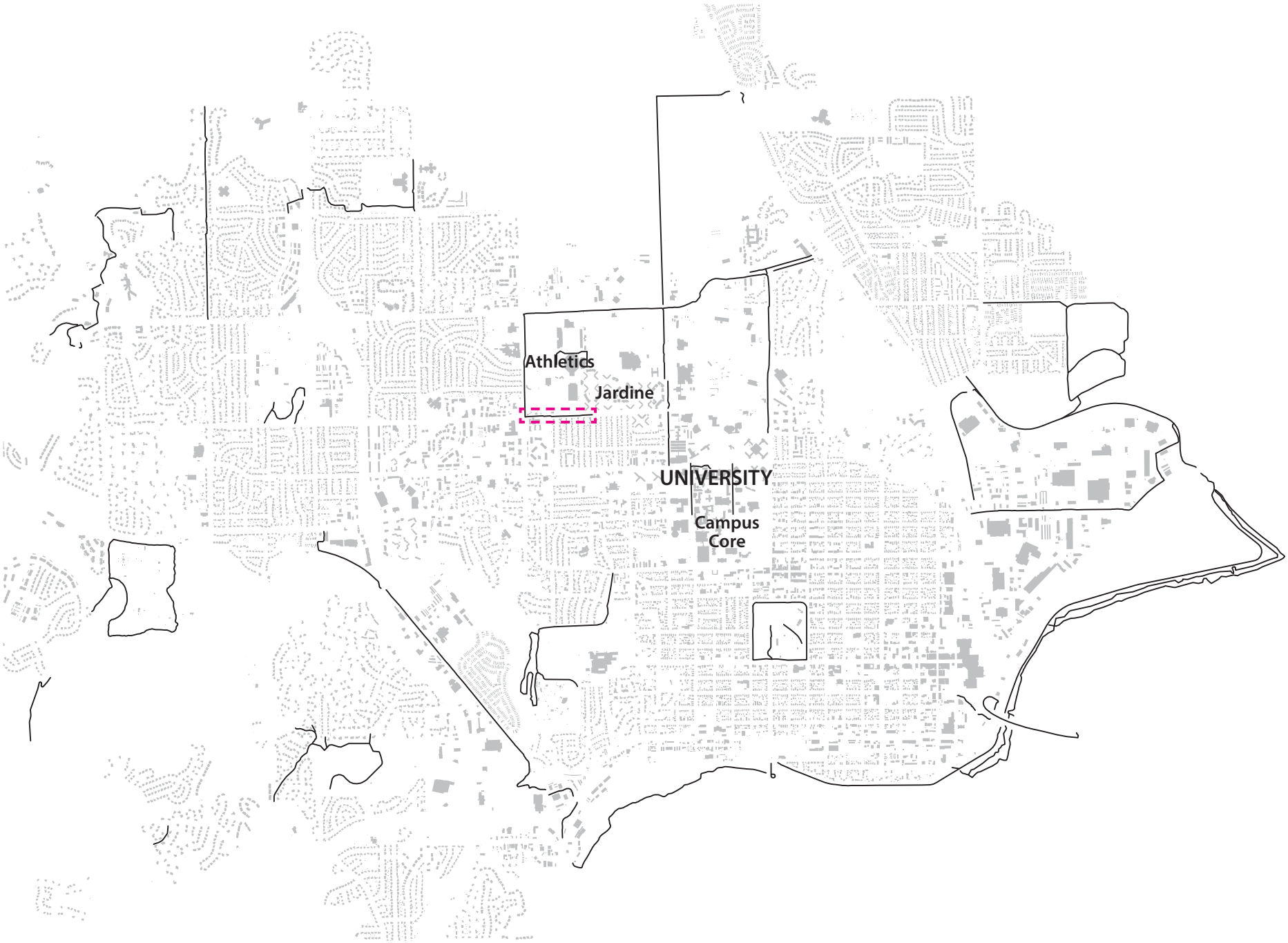


Figure 7.15 City of MHK trails network in black, with study site indicated in magenta and buildings in gray (adapted from Guarneri 2017)

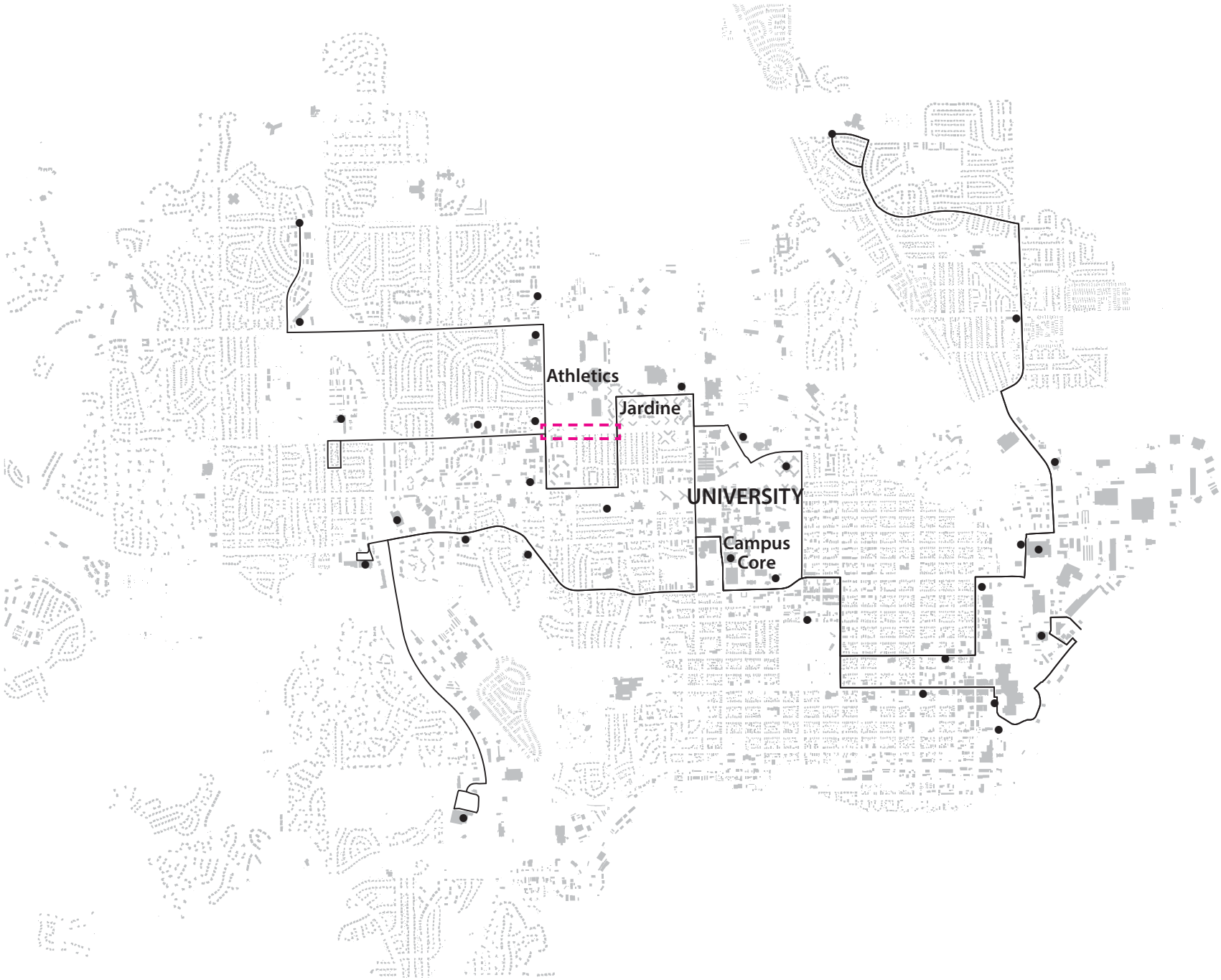


Figure 7.16 ATA bus routes and stops in black, with study site indicated in magenta and buildings in gray (adapted from Guarneri 2017)

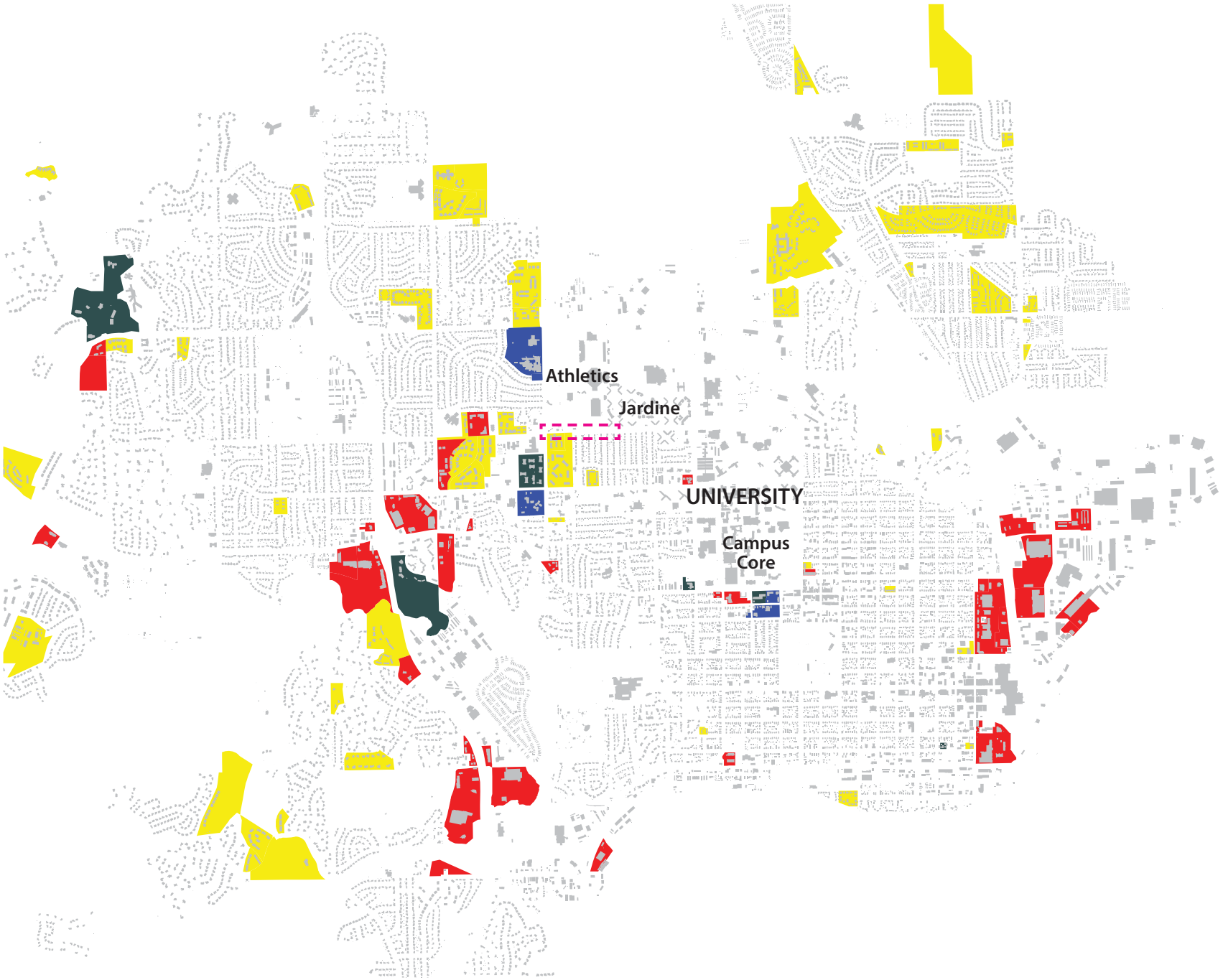
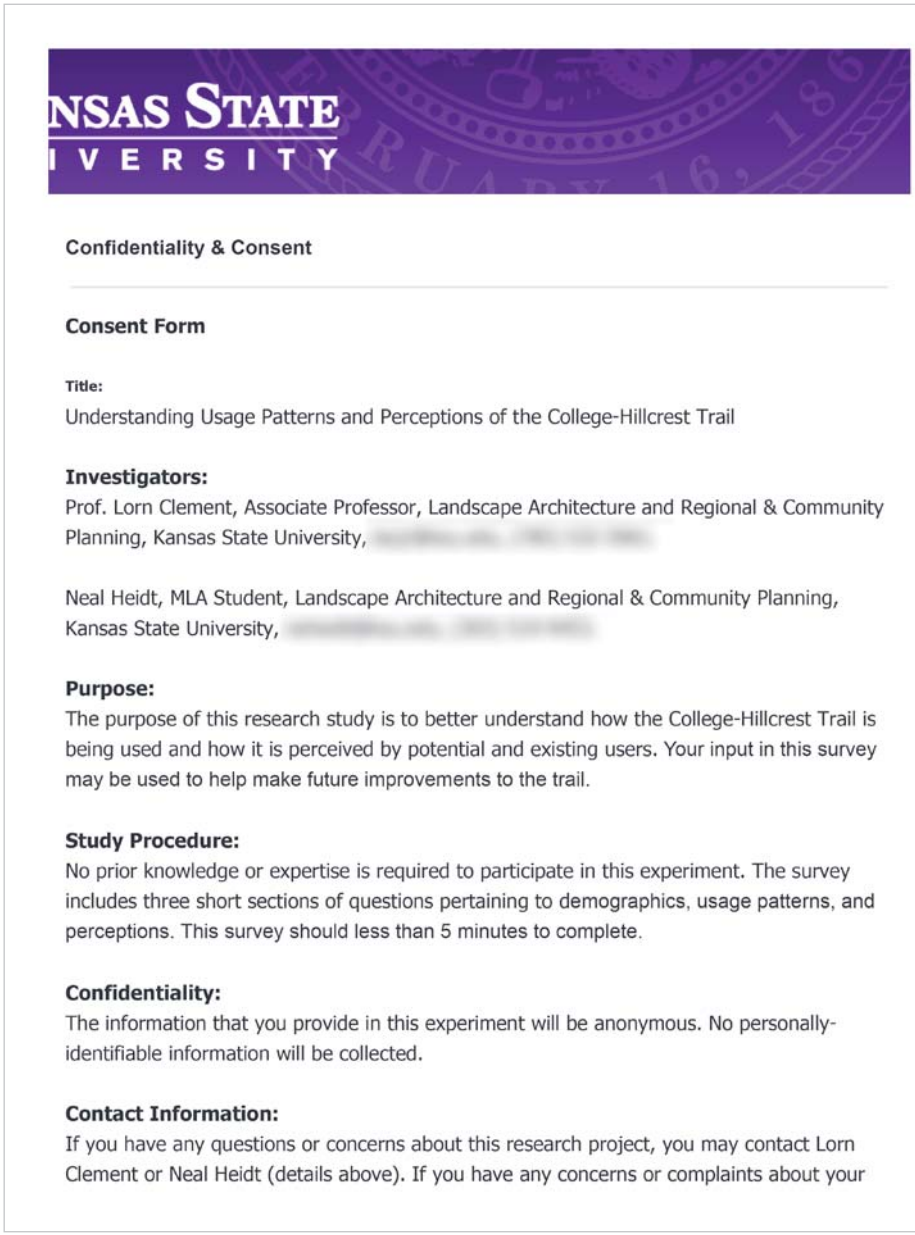


Figure 7.17 Prominent PUD activity designations: postsecondary and medical designations are shown in blue, commercial districts are shown in red, mixed-use developments and churches are shown in slate, and residential designations are shown in yellow; the study site is indicated in magenta and buildings are shown in gray (adapted from Guarneri 2017)

APPENDIX I: INTERCEPT SURVEY



NSAS STATE
IVERSITY

Confidentiality & Consent

Consent Form

Title:
Understanding Usage Patterns and Perceptions of the College-Hillcrest Trail

Investigators:
Prof. Lorn Clement, Associate Professor, Landscape Architecture and Regional & Community Planning, Kansas State University,

Neal Heidt, MLA Student, Landscape Architecture and Regional & Community Planning, Kansas State University,

Purpose:
The purpose of this research study is to better understand how the College-Hillcrest Trail is being used and how it is perceived by potential and existing users. Your input in this survey may be used to help make future improvements to the trail.

Study Procedure:
No prior knowledge or expertise is required to participate in this experiment. The survey includes three short sections of questions pertaining to demographics, usage patterns, and perceptions. This survey should less than 5 minutes to complete.

Confidentiality:
The information that you provide in this experiment will be anonymous. No personally-identifiable information will be collected.

Contact Information:
If you have any questions or concerns about this research project, you may contact Lorn Clement or Neal Heidt (details above). If you have any concerns or complaints about your rights as a research participant and/or your experiences while participating in this study, you may contact the Kansas State University Research Compliance Office:

203 Fairchild Hall
Manhattan KS, 66502
785-532-3224
comply@k-state.edu

Consent:
Your participation in this study is entirely voluntary and you may refuse to participate or withdraw from the study at any time. By clicking next, you acknowledge that you have read and understand the terms above. By continuing with this study you verify your consent to participate in this study.

Usage Patterns

How often do you use this trail?

1+ times/day 1+ times/week 1+ times/month Rarely

When do you primarily use this trail?

Never All the time

Before dawn
When the sun is up
After dusk

What do you primarily use this trail to do?

Never All the time

Access stadiums/athletics
Access University campus
Recreation/leisure

Figure 7.18 Qualtrics intercept survey, seen here in iPad format

Other, please describe...

How do you primarily use this trail?

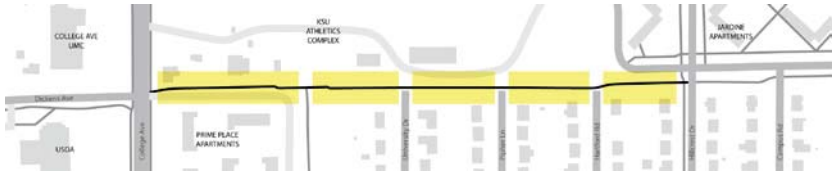
Bike | Run | Walk | Other, please describe...

With whom do you typically use this trail?

Alone/self | With a toddler or pet | With one other person | In a group of 3 or larger

Which segments of the trail do you use most?

Tap the boxes to select areas. For instance, if you use all the trail from College Ave to Hillcrest Dr for most of your trips, you would click all boxes.



User Perceptions

If you saw the following items while using this trail, would you feel less safe or more safe?

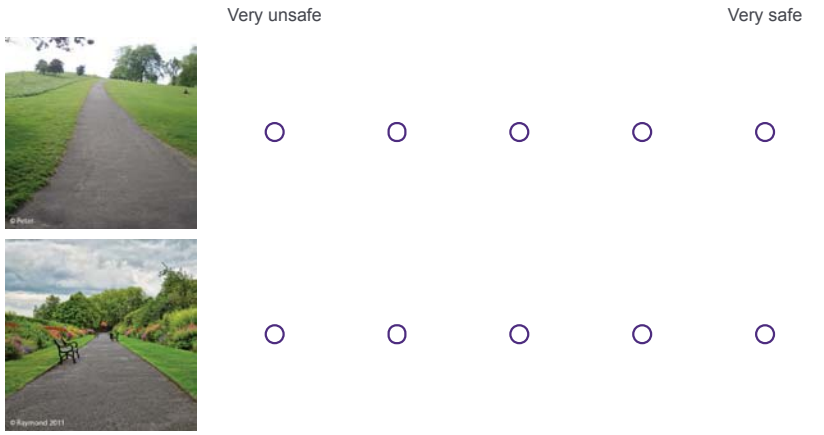
Much less safe | Much safer

For the following questions, please rate each photo based on how safe the trail in the photo appears.

Please rate:

Very unsafe | Very safe

Figure 7.18 Qualtrics intercept survey, seen here in iPad format



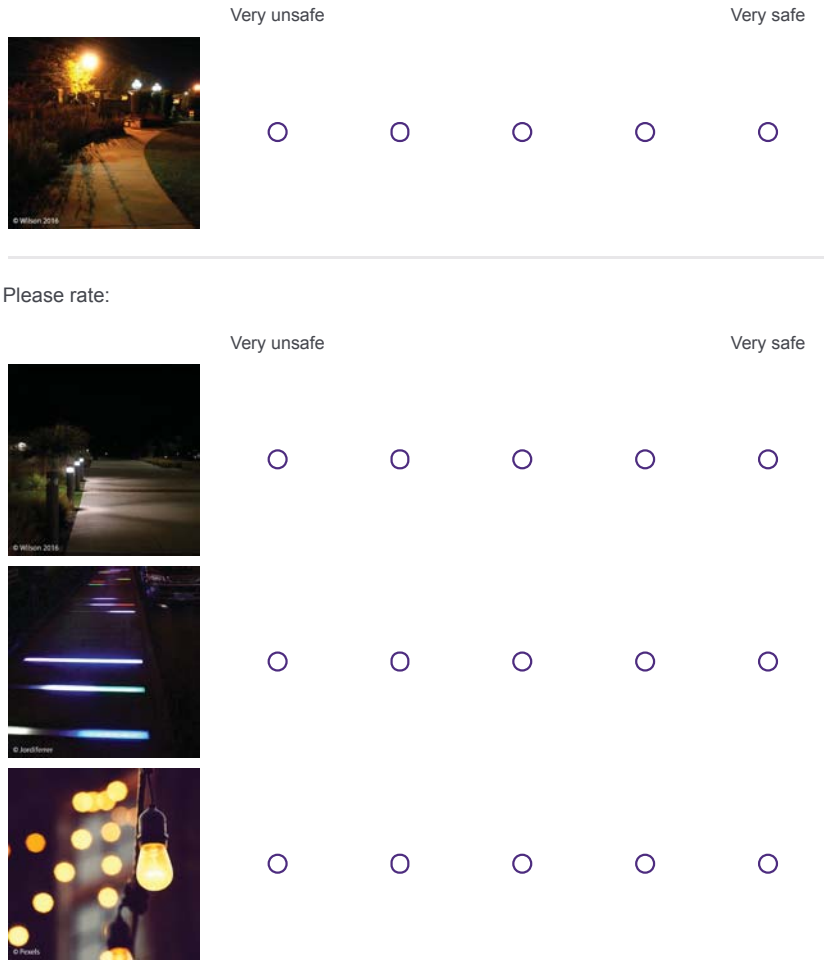


Figure 7.18 Qualtrics intercept survey, seen here in iPad format

Very unsafe Very safe

Overall, how safe do you feel on this trail?

Very unsafe Very safe

Demographic Information

What is your age?

Which gender do you most identify with?

Female Male

Which ethnicity do you most identify with?

White/Caucasian | Black/African-American | Asian | Native American | Pacific Islander | Other

Comments

If you have any questions, comments, or concerns about this trail, please list them here.

Powered by Qualtrics

Figure 7.18 Qualtrics intercept survey, seen here in iPad format

RECRUITMENT PROCEDURE

1) CONVERSATION

All study subjects will be trail users. I will recruit these study subjects by initiating a conversation with them as I encounter them on the site:

"Excuse me... Hello. I'm a K-State student studying the ways people use and perceive this trail. Could you spare 3 minutes to take a survey?"

If the potential study subject responds with a "yes"...

"Great! Here is the survey. You need to read the Consent Statement at the bottom of the first page before you begin. When you're ready to begin, click the arrows in the lower right-hand corner."

I will then hand the study subject an iPad with the survey on it.

2) "YARD SIGNS"

18-inch by 24-inch "yard signs" will be posted at each entry to the trail. If existing lighting makes reading these signs difficult, battery-powered book lamps will be used to illuminate each sign.

3) BADGE

I will wear a badge stating my role as graduate student, my role as survey proctor, and my affiliation to the K-State Department of Landscape Architecture and Regional & Community Planning.

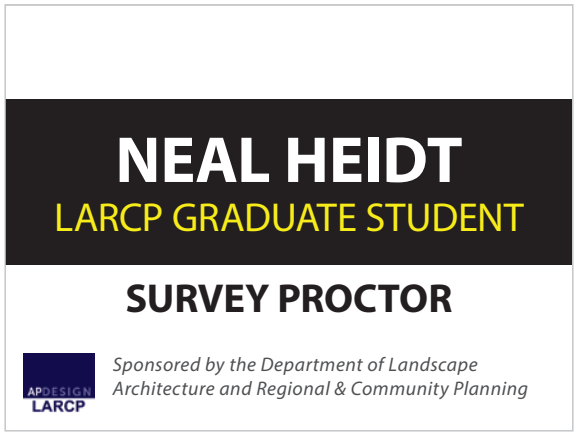


Figure 7.19 Sign and badge used for intercept survey recruitment

November 5, 2016

Laurence A. Clement, Jr., JD, ASLA
Department of Landscape Architecture and Regional & Community Planning
College of Architecture, Planning, and Design
Kansas State University

Research Being Conducted Along College Avenue-Hillcrest Drive Trail

Dear neighbor,

A graduate student in landscape architecture will be conducting questionnaire surveys on the trail between College Avenue and Hillcrest Drive. These surveys will occur over the next four weeks. This includes several survey times between dusk and dawn. The purpose of this survey is to understand the ways residents like you use and perceive the trail. Survey findings will be used to provide the City of Manhattan with recommendations in their effort to make this trail safer at night.

Please continue to use this trail as you normally would. If you are approached by a student wearing a reflective vest with a badge labeled, "LARCP," please take 3 minutes to complete the survey. If you detect any threats to the wellbeing of the survey staff or trail users, please do not hesitate to let me know.

This research has been approved by K-State IRB, with the number #8519. In case you would like to learn more about this study, I have attached a fact sheet to this letter.

Thank you,

Laurence A. Clement
Principal Investigator
Associate Professor, Landscape Architecture

PROJECT TITLE: Understanding Usage Patterns and Perceptions of the College-Hillcrest Trail

APPROVAL DATE OF PROJECT: 10/28/2016

IRB APPROVAL NUMBER: #8519

PRINCIPAL INVESTIGATOR:
Laurence A. Clement, Jr., JD
Associate Professor
Department of Landscape Architecture and Regional & Community Planning

CO-INVESTIGATOR(S):
Neal Heidt
Graduate Student
Department of Landscape Architecture and Regional & Community Planning

Brent Chamberlain, PhD
Assistant Professor
Department of Landscape Architecture and Regional & Community Planning

Katie Heinrich, PhD
Associate Professor
Department of Kinesiology

CONTACT NAME AND PHONE FOR ANY PROBLEMS/QUESTIONS:
Prof. Laurence Clement,
Neal Heidt,

IRB CHAIR CONTACT/PHONE INFORMATION:

- Rick Scheidt, Chair, Committee on Research Involving Human Subjects, 203 Fairchild Hall, Kansas State University, Manhattan, KS 66506,
- Cheryl Doerr, Associate Vice President for Research Compliance, 203 Fairchild Hall, Kansas State University, Manhattan, KS 66506,

SPONSOR OF PROJECT: Kansas State University Department of Landscape Architecture and Regional & Community Planning

PURPOSE OF THE RESEARCH: The City of Manhattan ("the City") plans to place lights along the trail that runs between College Avenue and Hillcrest Drive. To aid the City in design, the K-State would like to understand how potential trail users use and perceive the trail. Findings from the study will be presented to the City.

PROCEDURES OR METHODS TO BE USED: Data about the site will be collected, analyzed, and then mapped. Surveys of trail users and neighborhood residents will be conducted. The results of the two surveys will be compared to the maps previously made. These maps will be used to understand the connection between landscape traits and human experiences.

LENGTH OF STUDY: The survey takes an estimated 2-4 minutes to complete.

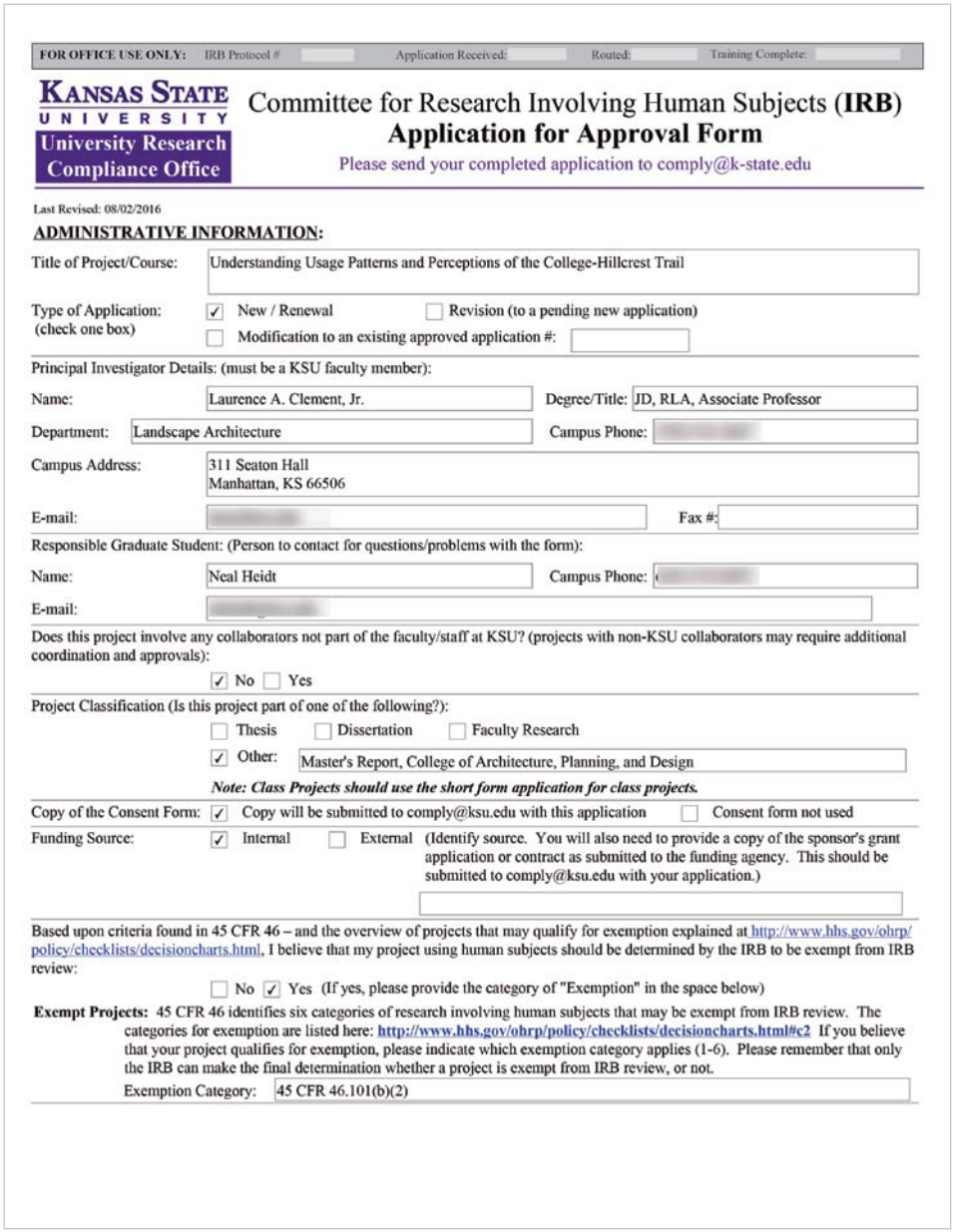
RISKS OR DISCOMFORTS ANTICIPATED: There are no risks involved in survey participation. The survey conductor will also wear a reflective vest and, if necessary, carry a lantern to increase visibility while the survey is being taken.

BENEFITS ANTICIPATED: Survey responses may be used by the City of Manhattan when improving the trail.

EXTENT OF CONFIDENTIALITY: Names or other personal identifiers will not be asked in the survey.

PARENTAL APPROVAL FOR MINORS: No person under 18 years of age will be permitted to take part in this study.

Figure 7.20 Informative letter and fact sheet regarding intercept survey, distributed to neighboring residents



FOR OFFICE USE ONLY: IRB Protocol # Application Received: Routed: Training Complete:

KANSAS STATE UNIVERSITY
University Research Compliance Office

Committee for Research Involving Human Subjects (IRB)
Application for Approval Form

Please send your completed application to comply@k-state.edu

Last Revised: 08/02/2016

ADMINISTRATIVE INFORMATION:

Title of Project/Course: Understanding Usage Patterns and Perceptions of the College-Hillcrest Trail

Type of Application: (check one box)
- [x] New / Renewal
- [ ] Revision (to a pending new application)
- [ ] Modification to an existing approved application #:

Principal Investigator Details: (must be a KSU faculty member):

Name: Laurence A. Clement, Jr. Degree/Title: JD, RLA, Associate Professor

Department: Landscape Architecture Campus Phone:

Campus Address: 311 Seaton Hall, Manhattan, KS 66506

E-mail: Fax #:

Responsible Graduate Student: (Person to contact for questions/problems with the form):

Name: Neal Heidt Campus Phone:

E-mail:

Does this project involve any collaborators not part of the faculty/staff at KSU? (projects with non-KSU collaborators may require additional coordination and approvals):
- [x] No
- [ ] Yes

Project Classification (Is this project part of one of the following?):
- [ ] Thesis
- [ ] Dissertation
- [ ] Faculty Research
- [x] Other: Master's Report, College of Architecture, Planning, and Design

Note: Class Projects should use the short form application for class projects.

Copy of the Consent Form:
- [x] Copy will be submitted to comply@ksu.edu with this application
- [ ] Consent form not used

Funding Source:
- [x] Internal
- [ ] External (Identify source. You will also need to provide a copy of the sponsor's grant application or contract as submitted to the funding agency. This should be submitted to comply@ksu.edu with your application.)

Based upon criteria found in 45 CFR 46 – and the overview of projects that may qualify for exemption explained at http://www.hhs.gov/ohrp/policy/checklists/decisioncharts.html, I believe that my project using human subjects should be determined by the IRB to be exempt from IRB review:
- [ ] No
- [x] Yes (If yes, please provide the category of "Exemption" in the space below)

Exempt Projects: 45 CFR 46 identifies six categories of research involving human subjects that may be exempt from IRB review. The categories for exemption are listed here: **http://www.hhs.gov/ohrp/policy/checklists/decisioncharts.html#c2** If you believe that your project qualifies for exemption, please indicate which exemption category applies (1-6). Please remember that only the IRB can make the final determination whether a project is exempt from IRB review, or not.

Exemption Category: 45 CFR 46.101(b)(2)

MODIFICATION:

Is this a modification of an approved protocol? [x] **No** [ ] **Yes** **If yes, please comply with the following:**

If you are requesting a modification or a change to an IRB approved protocol, please provide a concise description of all of the changes that you are proposing in the following block. Additionally, please highlight or bold the proposed changes in the body of the protocol where appropriate, so that it is clearly discernible to the IRB reviewers what and where the proposed changes are. This will greatly help the committee and facilitate the review.

N/A

I. NON-TECHNICAL SYNOPSIS (Please provide a brief narrative description of proposal. This should typically be less than 75 words and be easily understood by nonscientists):

This survey will be used to understand trail usage patterns and trail perceptions along a 0.3-mile stretch of a city trail ("the Trail") between College Avenue and Hillcrest Drive, in Manhattan, Kansas. Findings from this anonymous study will be sent to the City of Manhattan ("the City"). Trail users encountered on site will be asked to take a 3-5 minute survey on the spot ("intercept survey"). This survey will be conducted during both daylight and non-daylight hours.

II. BACKGROUND (concise narrative review of the literature and basis for the study):

The City recently obtained funding to install lighting along all or part of the Trail in 2017. Before construction of these improvements, the City wishes to have a study conducted to determine the ways in which users use ("usage patterns") and perceive the trail. This will help them understand specific correlations between existing elements of the trail environment and human behavior.

III. PROJECT/STUDY DESCRIPTION

(Please provide a concise narrative description of the proposed activity in terms that will allow the IRB or other interested parties to clearly understand what it is that you propose to do that involves human subjects. This description must be in enough detail so that IRB members can make an informed decision about the proposal).

I will walk the site, approaching trail users as I encounter them. I will ask the users I encounter to take the survey at that moment using a tablet I will provide. The survey will take each subject roughly 3 minutes to complete. I will conduct this survey over an elapsed 2-3 weeks, ensuring that I include a total of 24 unique weekday hours and 24 unique weekend hours. There will be no option to take the survey off-site or outside of designated survey hours.

IV. OBJECTIVE

(Briefly state the objective of the research – what you hope to learn from the study).

This study will be used to synthesize design recommendations for the City as it prepares to make improvements to the trail. The intent of the design recommendations will be to improve the user's experience of the Trail environment and to improve perceptions of the Trail among potential users.

V. DESIGN AND PROCEDURES (succinctly outline formal plan for study)

A. List all sites where this research will be conducted:

"The Trail:" K-State Perimeter Loop Trail, between College Avenue/Dickens Avenue intersection and Hillcrest Drive

Boundaries (clockwise from north): fence along south end of K-State Athletics complex, Jardine/Kerr Drive, Hillcrest Drive, fences along private residences and dead ends of neighborhood streets, detention basin, private drive belonging to Collegiate Villa Condominiums, College Avenue

B. Variables to be studied: 1) Demographics (age, gender, ethnicity)
2) Usage patterns (frequency, time of day, reason for use [destination or activity], mode [bike/

Figure 7.21 IRB application for intercept survey

run/walk/other], alone or in a group, trail segments used [select on map])
3) User perceptions (presence of security measures, vegetation in daytime, vegetation at night, lighting styles, lighting frequency)

C. Data collection methods: (surveys, instruments, etc - **copies must submitted to comply@k-state.edu**).

The survey will be conducted using a Qualtrics survey on a tablet (survey attached to e-mail).

While conducting the survey at night, Neal will wear a reflective vest and badge identifying him as a researcher. He will also carry a lantern to illuminate his face and the immediate surroundings to provide a safe environment. Additionally, his GPS location will be continuously recorded by a cell phone application that will be monitored by a trusted friend.

D. List any factors that might lead to a subject dropping out or withdrawing from a study. These might include, but are not limited to emotional or physical stress, pain, inconvenience, etc.

None foreseen; each subject must give consent prior to participating in survey and have the ability to opt out of the survey at any point before he/she submits his/her survey.

E. List all biological samples taken: (if any)

N/A

F. Debriefing procedures for participants:

Upon completion of the survey, respondents will be given directions on how to acquire the report from KREx.

VI. RESEARCH SUBJECTS:

A. Source:

Users of the Trail

B. Number: (provide a brief rationale for your sample size)

n ≥ 60 for the second and third demographic questions (aiming for distribution of gender and race). Based on the demographics of Manhattan, Kansas.

C. Inclusion criteria: (List any unique qualifiers desirable for research subject participation)

All trail users who consent to the terms of the survey and complete the survey. This includes physically or mentally disabled (who have capacity to provide legal consent).

D. Exclusion criteria: (list any unique disqualifiers for research subject participation)

If there are too many trail users at any particular time to effectively approach individuals or groups, some trail users may not be included (for example, during an anticipated "rush hour" at the beginning or end of a work day). This is most likely to happen in instances when Neal is preoccupied with administering the survey to a trail user.

E. Recruitment procedures:
How will subjects be identified?

All users of the Trail are prospective subjects of this study

How will subjects be recruited (advertisement, associates, etc.) ?

Neal will wear a badge with his name, department, and the words, "Survey Proctor." Yard signs advertising the study will also be placed at each of the 6 trail entries (pending approval from The City).

How will subjects be enrolled?

Each subject who agrees to the consent statement on the first page of the survey is enrolled.

Describe any follow-up recruitment procedures: (reminder emails, mailings, etc.)

N/A

VII. RISK - PROTECTION - BENEFITS:

The answers for the three questions below are central to human subjects research. You must demonstrate a reasonable balance between anticipated risks to research participants, protection strategies, and anticipated benefits to participants or others.

A. Risk for Subjects: (check all that apply)

- ☐ Exposure to infectious diseases
- ☐ Use of confidential records
- ☐ Exposure to radiation
- ☐ Manipulation of psychological or social variables such as sensory deprivation, social isolation, psychological stressors
- ☐ Examining for personal or sensitive information in surveys or interviews
- ☐ Presentation of materials which subjects might consider sensitive, offensive, threatening, or degrading
- ☐ Invasion of privacy of subject or family
- ☐ Social or economic risk
- ☐ Risk associated with exercise or physical exertion
- ☐ Legal risk
- ☐ Review of medical records
- ☐ Review of criminal records
- ☐ HIV/AIDS or other STD's
- ☐ Employment/occupational risk
- ☐ Others – Please explain below (Indirect risks, risk to individuals who are not the primary subjects):

N/A

B. Minimizing Risk: (Describe specific measures used to minimize or protect subjects from anticipated risks.)

All data is anonymous with no personally identifiable information collected (only gender, age and race).

C. Benefits: (Describe any reasonably expected benefits for research participants, a class of participants, or to society as a whole.)

The future physical development of the Trail may be influenced by the findings of the survey.

D. More than Minimal Risk? In your opinion, does the research involve more than minimal risk to subjects? ("Minimal risk" means that "the risks of harm anticipated in the proposed research are not greater, considering probability and magnitude, than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests.")

☐ Yes ☑ No

VIII. CONFIDENTIALITY:

Confidentiality is the formal treatment of information that an individual has disclosed to you in a relationship of trust and with the expectation that it will not be divulged to others without permission in ways that are inconsistent with the understanding of the original disclosure. Consequently, it is your responsibility to protect information that you gather from human research subjects in a way that is consistent with your agreement with the volunteer and with their expectations.

Explain how you are going to protect confidentiality of research subjects and/or data or records. Include plans for maintaining records after completion.

There will be no names or personal identifiers collected with the data.

Figure 7.21 IRB application for intercept survey

IX. INFORMED CONSENT: Informed consent is a critical component of human subjects research - it is your responsibility to make sure that any potential subject knows exactly what the project that you are planning is about, and what his/her potential role is. (There may be projects where some forms of "deception" of the subject is necessary for the execution of the study, but it must be carefully justified to and approved by the IRB). A schematic for determining when a waiver or alteration of informed consent may be considered by the IRB is found at **http://www.hhs.gov/ohrp/policy/checklists/decisioncharts.html#c10**

Even if your proposed activity does qualify for a waiver of informed consent, you must still provide potential participants with basic information that informs them of their rights as subjects, i.e. explanation that the project is research and the purpose of the research, length of study, study procedures, debriefing issues to include anticipated benefits, study and administrative contact information, confidentiality strategy, and the fact that participation is entirely voluntary and can be terminated at any time without penalty, etc. Even if your potential subjects are completely anonymous, you are obliged to provide them (and the IRB) with basic information about your project. See informed consent example on the URCO website. It is a federal requirement to maintain informed consent forms for 3 years after the study completion.

Answer the following questions about the informed consent procedures.

☐ Yes ☑ No **A.** Are you using a written informed consent form? If "yes," include a copy with this application. If "no" see B.

☐ Yes ☑ No **B.** In accordance with guidance in 45 CFR 46, I am requesting a waiver or alteration of informed consent elements (see section VIII above). If "yes," provide a basis and/or justification for your request.

To avoid the collection of names or personal identifiers, consent will be collected by the individual clicking the next button on the Qualtrics survey.

☐ Yes ☑ No **C.** Are you using the online Consent Form Template provided by the URCO? If "no," does your Informed Consent document have all the minimum required elements of informed consent found in the Consent Form Template? (Please explain)

No. We are including the list of investigators, their contact information, a statement of purpose and procedures as well as a clarification that this is an anonymous survey. There is a statement that the survey is voluntary and that they can withdraw at any time. Contact information for the URCO office is presented.

☑ Yes ☐ No **D.** Are your research subjects anonymous? If they are anonymous, you will not have access to any information that will allow you to determine the identity of the research subjects in your study, or to link research data to a specific individual in any way. Anonymity is a powerful protection for potential research subjects. (An anonymous subject is one whose identity is unknown even to the researcher, or the data or information collected cannot be linked in any way to a specific person).

☐ Yes ☑ No **E.** Are subjects debriefed about the purposes, consequences, and benefits of the research? Debriefing refers to a mechanism for informing the research subjects of the results or conclusions, after the data is collected and analyzed, and the study is over. (If "no" explain why.) **Copy of debriefing statement to be utilized should be submitted to comply@k-state.edu with your application.**

No, there is no formal debriefing statement. However, they have been presented with knowledge to contact the City regarding updates pertaining to the trail or to search for Neal Heidt's Masters Report on KREx.

F. Describe the Informed Consent Process:

Who is obtaining the consent? (i.e. Principle Investigator, Graduate Student, etc.)

Graduate Student

When and where will consent be obtained?

Consent will be obtained on the study site, immediately before beginning the survey.

If assent (for minors) is required, please describe who will obtain the assent? (Assent means a child's affirmative agreement to participate in research)

Minors will not be allowed to take the survey.

If assent (for minors) is required, when and where will assent be obtained?

N/A

How will consent be obtained from non-English speaking participants? (a translated written form, orally, identify the name and qualifications of the individual providing the translation)

Survey and consent statement will be given in English only.

Informed Consent Checklist

Items	YES	NO	N/A
Does the title appear at the top of the consent/assent form?	☑	☐	☐
Is the consent/assent form written toward the subject?	☑	☐	☐
Is there a statement that explains that the study is *research*?	☑	☐	☐
Is there a statement that explains the *purpose* of the research?	☑	☐	☐
Are the procedures to be followed explained clearly and adequately?	☑	☐	☐
Does the consent document describe *risks or discomforts* to subjects as a result of participating in the research?	☑	☐	☐
Is the consent/assent form written in the *native language* of the potential subject?	☑	☐	☐
Are participants compensated?	☐	☑	☐
If the subjects' identity is known to the PI, does the form detail how confidentiality of records will be maintained?	☐	☐	☑
Is contact information for both the PI and the URCO/IRB office included?	☑	☐	☐
Does the consent document indicate to the participant that he/she can withdraw at any time from the project without penalty or loss of benefit?	☑	☐	☐
Are there probable circumstances which would require the PI to terminate a subject's participation regardless of his or her consent?	☐	☑	☐
Is the consent document written in lay language (Recommended 8th grade level)?	☐	☑	☐

X. PROJECT INFORMATION: (If you answer Yes to any of the questions below, you should explain them in one of the paragraphs above)

☐ Yes ☑ No A. Deception of subjects? If "YES" explain why this is necessary.

N/A

☐ Yes ☑ No B. Shock or other forms of punishment

☐ Yes ☑ No C. Sexually explicit materials or questions about sexual orientation, sexual experience or sexual abuse

☐ Yes ☑ No D. Handling of money or other valuable commodities

Figure 7.21 IRB application for intercept survey

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☐ Yes	☑ No	E.	Extraction or use of blood, other bodily fluids, or tissues (if "yes', you must comply with facility and handling protections detailed in the 5th Edition of the Biosafety in Biomedical Laboratories (BMBL))
☐ Yes	☑ No	F.	Questions about any kind of illegal or illicit activity
☐ Yes	☑ No	G.	Questions about protected health information as defined by HIPAA
☐ Yes	☑ No	H.	Purposeful creation of anxiety
☐ Yes	☑ No	I.	Any procedure that might be viewed as invasion of privacy
☐ Yes	☑ No	J.	Physical exercise or stress
☐ Yes	☑ No	K.	Administration of substances (food, drugs, etc.) to subjects
☐ Yes	☑ No	L.	Any procedure that might place subjects at risk
☐ Yes	☑ No	M.	Will there be any use of Radioactive materials and/or use of Radioactive producing machines
☐ Yes	☑ No	N.	Any form of potential abuse; i.e., psychological, physical, sexual
☑ Yes	☐ No	O.	Is there potential for the data from this project to be published in a journal, presented at a conference, etc?
☑ Yes	☐ No	P.	Use of surveys or questionnaires for data collection. **Copies should be submitted to comply@k-state.edu with your application.**

XI. SUBJECT INFORMATION: (If you answer yes to any of the questions below, you should explain them in one of the paragraphs above)

☐ Yes	☑ No	a.	Under 18 years of age (these subjects require parental or guardian consent)
☑ Yes	☐ No	b.	Over 65 years of age
☐ Yes	☑ No	c.	Minorities as target population
☑ Yes	☐ No	d.	Physically or mentally disabled
☑ Yes	☐ No	e.	Economically or educationally disadvantaged
☐ Yes	☑ No	f.	Unable to provide their own legal informed consent
☐ Yes	☑ No	g.	Pregnant females as target population
☐ Yes	☑ No	h.	Victims
☐ Yes	☑ No	i.	Subjects in institutions (e.g., prisons, nursing homes, halfway houses)
☐ Yes	☑ No	j.	Are subjects likely to be vulnerable to coercion or undue influence
☐ Yes	☑ No	k.	Is this international research? If yes, provide details as to if OHRP regulations apply in or near the area you intend to conduct research or if you have contacted individuals for applicable regulations to human subject research.
☐ Yes	☑ No	l.	Are research subjects in this activity students recruited from university classes or volunteer pools? If so, do you have a reasonable alternative(s) to participation as a research subject in your project, i.e., another activity such as writing or reading that would serve to protect students from unfair pressure or coercion to participate in this project? If you answered this question "Yes," explain any alternatives options for class credit for potential human subject volunteers in your study. (It is also important to remember that: Students must be free to choose not to participate in research that they have signed up for at any time without penalty. Communication of their decision can be conveyed in any manner, to include simply not showing up for the research.)

N/A

☐ Yes	☑ No	m.	Is audio from the subjects recorded? If yes, how do you plan to protect the recorded information and mitigate any additional risks?

N/A

☐ Yes	☑ No	n.	Are research subjects' images being recorded (video taped, digitally recorded, photographed)? If yes, how do you plan to protect the recorded information and mitigate any additional risks?

N/A

XII. FDA ACTIVITIES: Answer the following questions about potential FDA regulated activities:

☐ Yes	☑ No	a.	Is this a Clinical Trial?

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☐ Yes	☑ No	b.	Are you using an FDA approved drug/device/diagnostic test?
☐ Yes	☑ No	c.	Does this activity involve the use of FDA-Regulated products? (biological products, color additives, food additives, human drugs, etc.)
☐ Yes	☑ No	d.	Has the protocol been submitted to the FDA, or are there plans to submit it to the FDA?
☐ Yes	☑ No	e.	Have you submitted an FDA form 3454 or 3455 (conflict of interest)?

XIII. CONFLICT OF INTEREST: Concerns have been growing that financial interests in research may threaten the safety and rights of human research subjects. Financial interests are not in them selves prohibited and may well be appropriate and legitimate. Not all financial interests cause Conflict of Interest (COI) or harm to human subjects. However, to the extent that financial interests may affect the welfare of human subjects in research, IRB's, institutions, and investigators must consider what actions regarding financial interests may be necessary to protect human subjects. Please answer the following questions:

☐ Yes	☑ No	a.	Do you or the institution have any proprietary interest in a potential product of this research, including patents, trademarks, copyrights, or licensing agreements?
☐ Yes	☑ No	b.	Do you have an equity interest in the research sponsor (publicly held or a non-publicly held company)?
☐ Yes	☑ No	c.	Do you receive significant payments of other sorts, eg., grants, equipment, retainers for consultation and/or honoraria from the sponsor of this research?
☐ Yes	☑ No	d.	Do you receive payment per participant or incentive payments?
		e.	If you answered **yes** to any of the above questions, please provide adequate explanatory information so the IRB can assess any potential COI indicated above.

N/A

XIV. PROJECT COLLABORATORS:

A. KSU Collaborators: List anyone affiliated with KSU who is collecting or analyzing data: (list all collaborators on the project, including co-principal investigators, undergraduate and graduate students).

Name:	Department:	Campus Phone:	Campus E-mail:
Neal Heidt	Department of Landscape Architecture and Regional & Community Planning	(303) 519-9453	neheidt@ksu.edu
Laurence Clement	Department of Landscape Architecture and Regional & Community Planning	(785) 532-2447	lacjr@ksu.edu
Dr. Brent Chamberlain	Department of Landscape Architecture and Regional & Community Planning	(785) 532-5781	brentchamberlain@ksu.edu
Dr. Katie Heinrich	Department of Kinesiology	(785) 532-7771	kmhphd@ksu.edu

Add Row | Delete Row

B. Non-KSU Collaborators: List all collaborators on your human subjects research project not affiliated with KSU in the spaces below. KSU has negotiated an Assurance with the Office for Human Research Protections (OHRP), the federal office responsible for oversight of research involving human subjects.

Name:	Organization:	Phone:	Institutional E-mail:
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A

Figure 7.21 IRB application for intercept survey

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N/A	N/A	N/A	N/A

Add Row | Delete Row

C. **Does your non-KSU collaborator's organization have an Assurance with OHRP?** (for Federalwide Assurance listings of other institutions, please reference the OHRP website under Assurance Information at: http://ohrp.cit.nih.gov/search).

☐ Yes ☐ No If yes, Collaborator's FWA # N/A

Is your non-KSU collaborator's IRB reviewing this proposal?

☐ Yes ☐ No If yes, IRB approval # N/A

XV. IRB Training:

A. **The URCO must have a copy of the Unaffiliated Investigator Agreement on file for each non-KSU collaborator who is not covered by their own IRB and assurance with OHRP.** When research involving human subjects includes collaborators who are not employees or agents of KSU the activities of those unaffiliated individuals may be covered under the KSU Assurance only in accordance with a formal, written agreement of commitment to relevant human subject protection policies and IRB oversight. The Unaffiliated Investigators Agreement can be found and downloaded at http://www.k-state.edu/research/comply/irb/forms

Online Training

TRAINING REQUIREMENTS HAVE RECENTLY CHANGED

The IRB has mandatory training requirements prior to protocol approval. Training is now offered through the Collaborative Institutional Training Initiative (CITI) Program. Instructions for registration and access to training are on the URCO website http://www.k-state.edu/research/comply/.

Use the check boxes below to select the training courses that apply to this application. If you have any questions about training, contact URCO at comply@ksu.edu, or (785) 532-3224.

Mandatory Training

Required for all Principal Investigators, research staff and students

☒ Responsible Conduct of Research

☒ IRB core modules

Required (Provost-mandated) for all full-time K-State employees

☑ Export Compliance

Required procedure-specific training (check all that apply to this protocol):

☐ International Research ☐ Research in Public Elementary and Secondary Schools ☐ Research with Children

☐ Research with Prisoners ☐ Internet Research ☐ Vulnerable Subjects - Research Involving Workers/Employees

☐ Research with Subjects with Physical Disabilities and Impairments ☐ Illegal Activities or Undocument Status in Human Research

☐ Gender and Sexuality Diversity in Human Research ☐ Research with human blood, body fluids, or tissues

☐ Research with Older Adults

All new personnel or personnel with expired training are required to register for CITI and take the new training requirements. If you previously completed online IRB modules, your training status will remain current until it expires. URCO will verify training from the previous system as well as the new system prior to approval of any protocol.

IRB Application Page 10

INVESTIGATOR ASSURANCE FOR RESEARCH INVOLVING HUMAN SUBJECTS

(Print this page separately because it requires a signature by the PI.)

P.I. Name: Laurence A Clement, Jr.

Title of Project: Understanding Usage Patterns and Perceptions of the College-Hillcrest Trail

XVI. ASSURANCES: As the Principal Investigator on this protocol, I provide assurances for the following:

A. **Research Involving Human Subjects: This project will be performed in the manner described in this proposal, and in accordance with the Federalwide Assurance FWA00000865 approved for Kansas State University available at http://www.hhs.gov/ohrp/assurances/forms/filasurt.html, applicable laws, regulations, and guidelines. Any proposed deviation or modification from the procedures detailed herein must be submitted to the IRB, and be approved by the Committee for Research Involving Human Subjects (IRB) prior to implementation.**

B. **Training: I assure that all personnel working with human subjects described in this protocol are technically competent for the role described for them, and have completed the required IRB training accessed via the URCO website at: http://www.k-state.edu/research/comply/irb/training. I understand that no proposals will receive final IRB approval until the URCO has documentation of completion of training by all appropriate personnel.**

C. **Extramural Funding: If funded by an extramural source, I assure that this application accurately reflects all procedures involving human subjects as described in the grant/contract proposal to the funding agency. I also assure that I will notify the IRB/URCO, the KSU PreAward Services, and the funding/contract entity if there are modifications or changes made to the protocol after the initial submission to the funding agency.**

D. **Study Duration: I understand that it is the responsibility of the Committee for Research Involving Human Subjects (IRB) to perform continuing reviews of human subjects research as necessary. I also understand that as continuing reviews are conducted, it is my responsibility to provide timely and accurate review or update information when requested, to include notification of the IRB/URCO when my study is changed or completed.**

E. **Conflict of Interest: I assure that I have accurately described (in this application) any potential Conflict of Interest that my collaborators, the University, or I may have in association with this proposed research activity.**

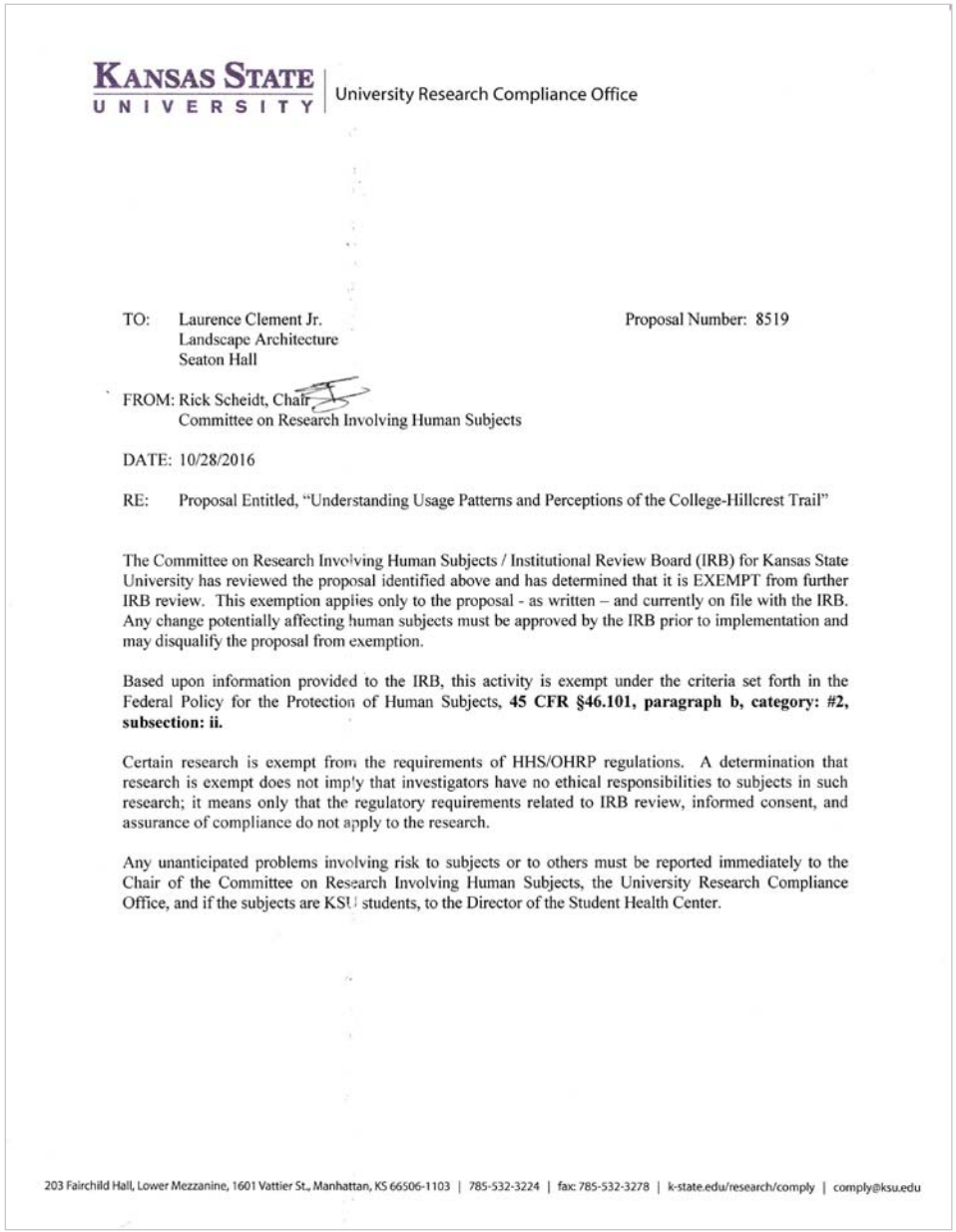
F. **Adverse Event Reporting: I assure that I will promptly report to the IRB / URCO any unanticipated problems involving risks to subjects or others that involve the protocol as approved. Unanticipated or Adverse Event Form is located on the URCO website at: http://www.k-state.edu/research/comply/irb/forms. In the case of a serious event, the Unanticipated or Adverse Events Form may follow a phone call or email contact with the URCO.**

G. **Accuracy: I assure that the information herein provided to the Committee for Human Subjects Research is to the best of my knowledge complete and accurate.**

You may sign this form using a digital signature. DO NOT sign the form until it has been completed.
You cannot edit the form entries once the form has been digitally signed. If you are making revisions to a previously signed form, right-click the digital signature and select Clear to remove the signature (this can only be done by the person who originally digitally signed the form). Forms that have not been signed will not be accepted.

P.I. Signature: Date:

Figure 7.21 IRB application for intercept survey



KANSAS STATE UNIVERSITY | University Research Compliance Office

TO: Laurence Clement Jr.
Landscape Architecture
Seaton Hall

Proposal Number: 8519

FROM: Rick Scheidt, Chair
Committee on Research Involving Human Subjects

DATE: 10/28/2016

RE: Proposal Entitled, "Understanding Usage Patterns and Perceptions of the College-Hillcrest Trail"

The Committee on Research Involving Human Subjects / Institutional Review Board (IRB) for Kansas State University has reviewed the proposal identified above and has determined that it is EXEMPT from further IRB review. This exemption applies only to the proposal - as written – and currently on file with the IRB. Any change potentially affecting human subjects must be approved by the IRB prior to implementation and may disqualify the proposal from exemption.

Based upon information provided to the IRB, this activity is exempt under the criteria set forth in the Federal Policy for the Protection of Human Subjects, **45 CFR §46.101, paragraph b, category: #2, subsection: ii.**

Certain research is exempt from the requirements of HHS/OHRP regulations. A determination that research is exempt does not imply that investigators have no ethical responsibilities to subjects in such research; it means only that the regulatory requirements related to IRB review, informed consent, and assurance of compliance do not apply to the research.

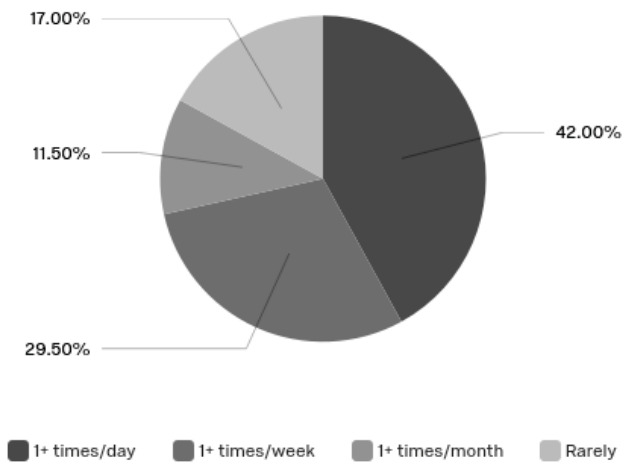
Any unanticipated problems involving risk to subjects or to others must be reported immediately to the Chair of the Committee on Research Involving Human Subjects, the University Research Compliance Office, and if the subjects are KSU students, to the Director of the Student Health Center.

203 Fairchild Hall, Lower Mezzanine, 1601 Vattier St., Manhattan, KS 66506-1103 | 785-532-3224 | fax: 785-532-3278 | k-state.edu/research/comply | comply@ksu.edu

Figure 7.22 Intercept survey IRB approval letter

FREQUENCY

HOW OFTEN DO YOU USE THIS TRAIL? (MULTIPLE CHOICE)



THOSE WHO PRIMARILY USE THE TRAIL IN THE FOLLOWING WAYS USE THE TRAIL AT WHAT FREQUENCY?

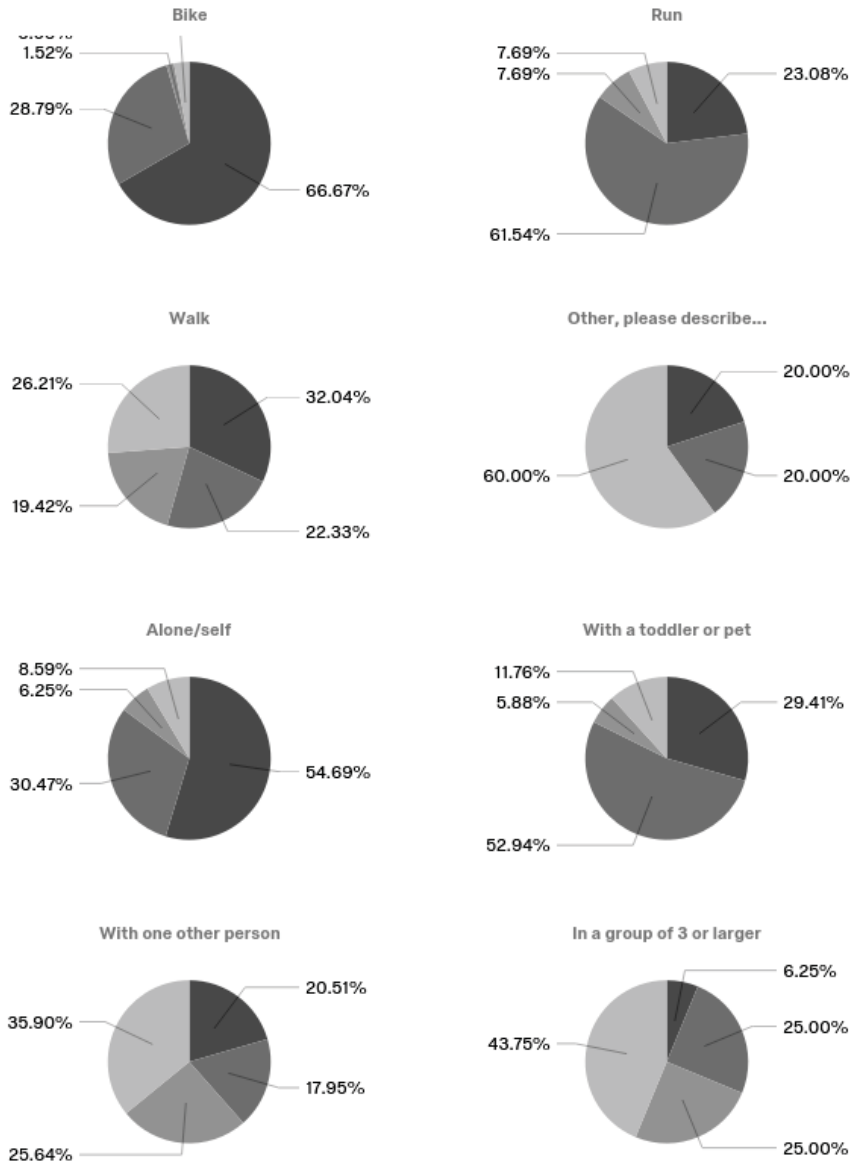


Figure 7.23 Intercept survey results (Qualtrics 2017)

TIME OF DAY

WHEN DO YOU PRIMARILY USE THIS TRAIL? (BLIND LIKERT)

Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
Before dawn	0.00	100.00	41.03	36.98	1367.77	108
When the sun is up	0.00	100.00	67.17	32.52	1057.23	178
After dusk	0.00	100.00	54.18	31.54	994.71	146

PURPOSE

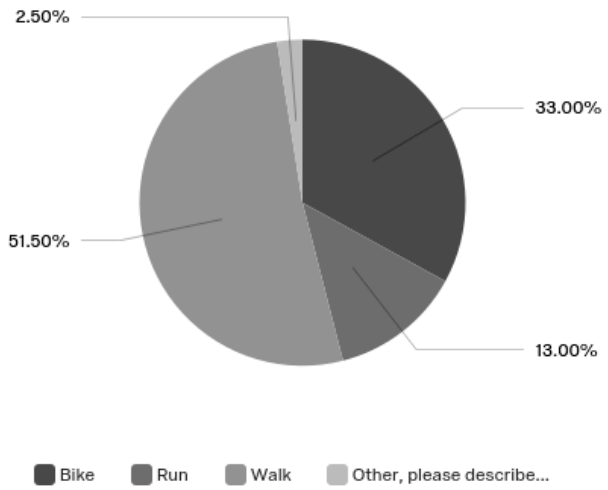
WHAT DO YOU PRIMARILY USE THIS TRAIL TO DO? (BLIND LIKERT)

Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
Access stadiums/athletics	0.00	100.00	59.08	36.52	1333.54	101
Access University campus	0.00	100.00	69.37	34.71	1204.64	103
Recreation/leisure	0.00	100.00	58.16	34.82	1212.57	142
Other, please describe...	0.00	100.00	46.45	40.34	1626.99	51

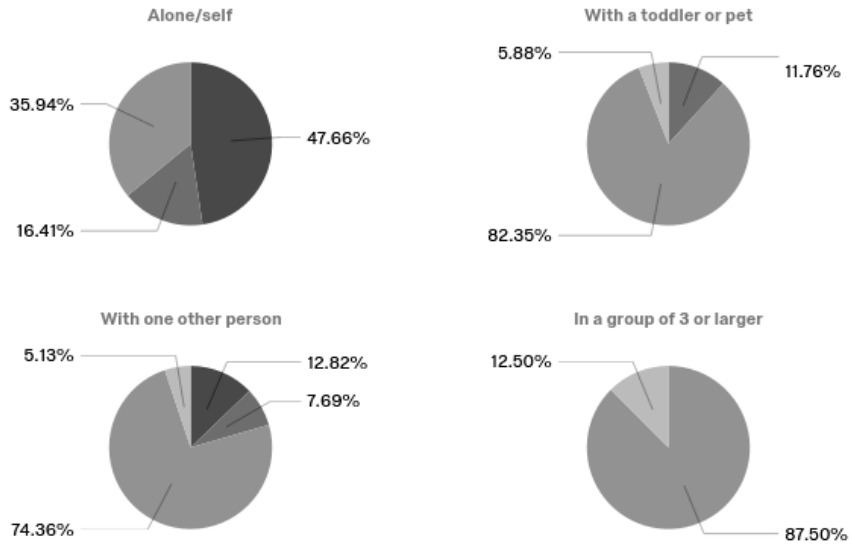
Figure 7.23 Intercept survey results (Qualtrics 2017)

ACTIVITY

HOW DO YOU PRIMARILY USE THIS TRAIL? (MULTIPLE CHOICE)



THOSE WHO PRIMARILY USE THE TRAIL FOR *X* ACTIVITY ALSO TYPICALLY USE THE TRAIL WITH WHOM?



THOSE WHO PRIMARILY USE THE TRAIL FOR *X* ACTIVITY ALSO TYPICALLY USE THE WHICH SECTIONS OF THE TRAIL?

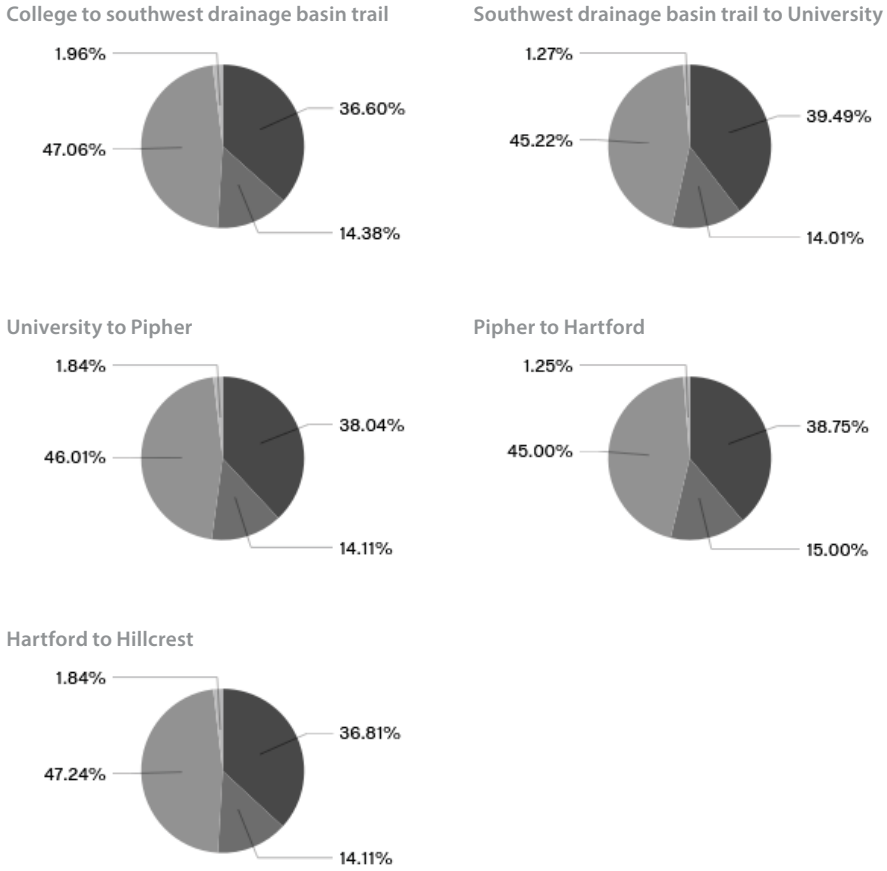
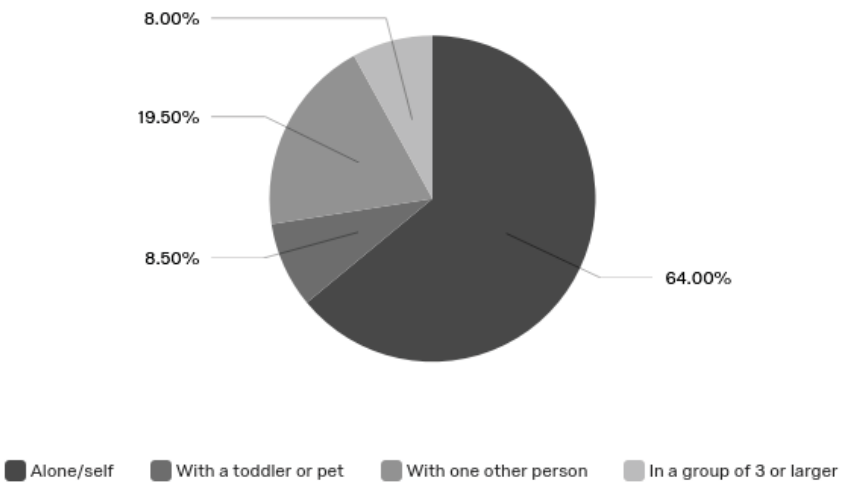


Figure 7.23 Intercept survey results (Qualtrics 2017)

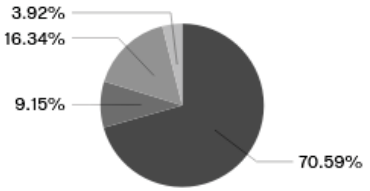
ACCOMPANIMENT

WITH WHOM DO YOU TYPICALLY USE THIS TRAIL? (MULTIPLE CHOICE)

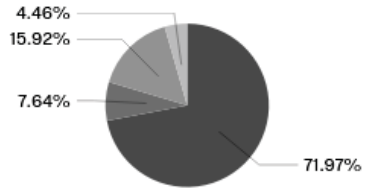


THOSE WHO PRIMARILY USE THE TRAIL WITH *X*, ALSO TYPICALLY USE THE WHICH SECTIONS OF THE TRAIL?

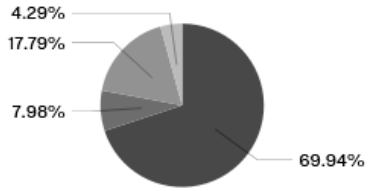
College to southwest drainage basin trail



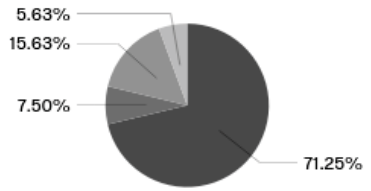
Southwest drainage basin trail to University



University to Pipher



Pipher to Hartford



Hartford to Hillcrest

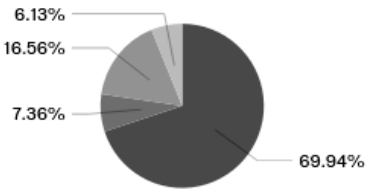
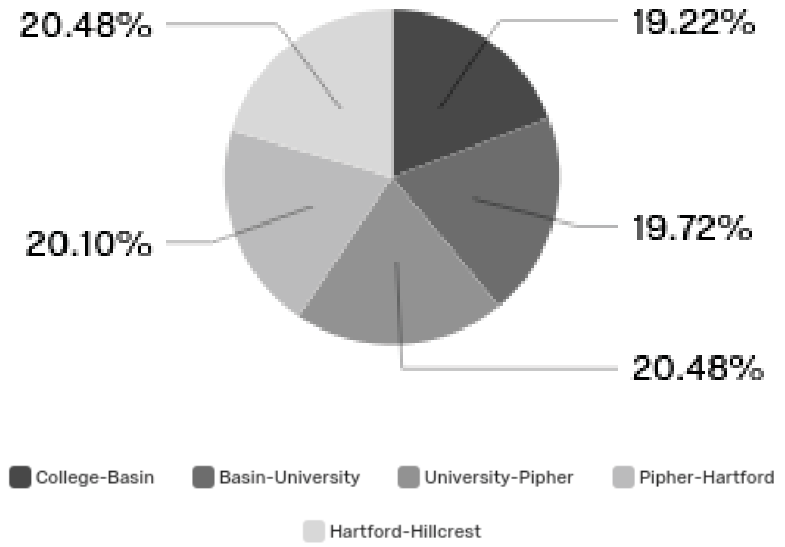


Figure 7.23 Intercept survey results (Qualtrics 2017)

SEGMENTS

WHICH SEGMENTS OF THE TRAIL DO YOU TYPICALLY USE? (MULTIPLE CHOICE, MULTIPLE SELECTIONS ALLOWED)



SECURITY MEASURES

IF YOU SAW THE FOLLOWING ITEMS WHILE USING THIS TRAIL, WOULD YOU FEEL LESS SAFE OR MORE SAFE? (LIKERT; WITH CONFIDENCE INTERVALS AT 95% CONFIDENCE LEVEL SHOWN)

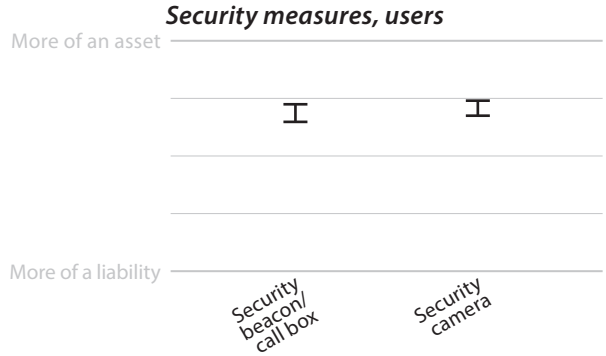


Figure 7.23 Intercept survey results (image at left from Qualtrics 2017)

TRAIL SAFETY RATING

OVERALL, HOW SAFE DO YOU FEEL ON THIS TRAIL? (BLIND LIKERT; WITH CONFIDENCE INTERVALS AT 95% CONFIDENCE LEVEL SHOWN)

AGE

WHAT IS YOUR AGE? (NUMBER ENTRY)

Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
What is your age?	18.00	78.00	28.68	12.87	165.66	200

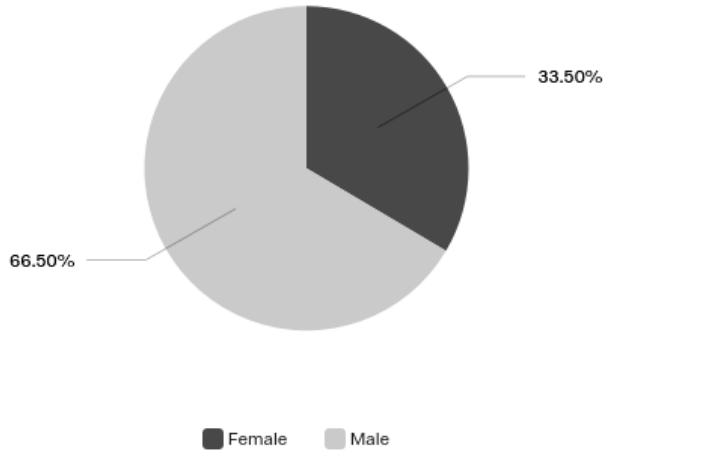
Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
Female	18.00	78.00	26.40	10.60	112.39	67
Male	18.00	72.00	29.82	13.73	188.58	133

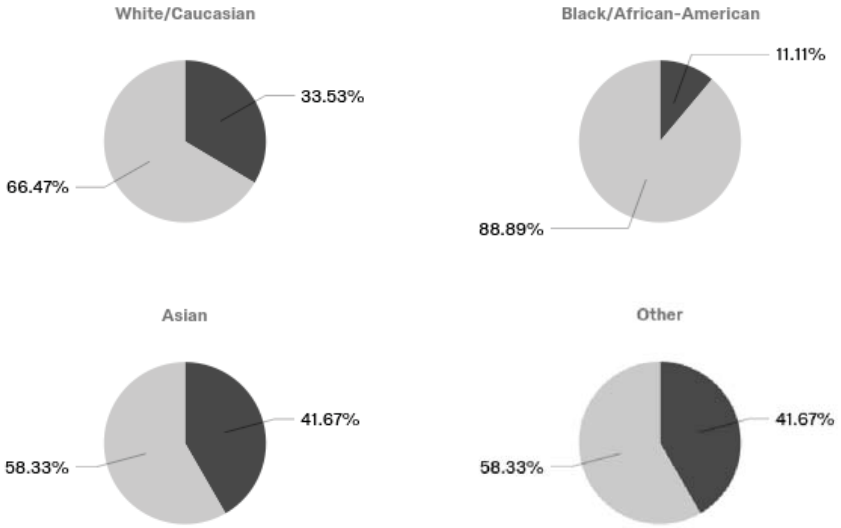
Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
White/Caucasian	18.00	78.00	29.11	13.67	186.80	167
Black/African-American	18.00	50.00	24.67	9.14	83.56	9
Asian	18.00	38.00	26.67	6.29	39.56	12
Native American	0.00	0.00	0.00	0.00	0.00	0
Pacific Islander	0.00	0.00	0.00	0.00	0.00	0
Other	20.00	41.00	27.58	6.26	39.24	12

Figure 7.23 Intercept survey results (images at right from Qualtrics 2017)

GENDER

WHICH GENDER DO YOU MOST IDENTIFY WITH? (MULTIPLE CHOICE)





ETHNICITY

WHICH ETHNICITY DO YOU MOST IDENTIFY WITH? (MULTIPLE CHOICE)

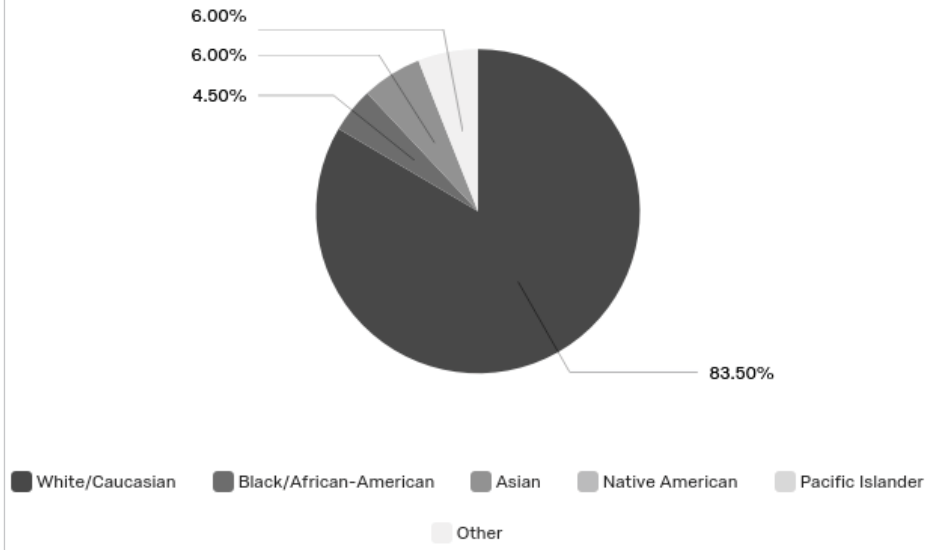
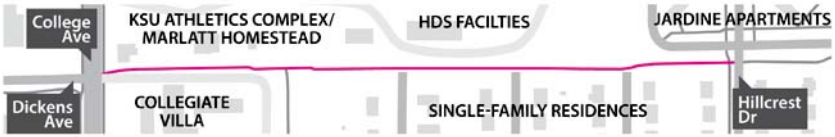


Figure 7.23 Intercept survey results (Qualtrics 2017)

APPENDIX J: STAKEHOLDER SURVEY

NSAS STATE
IVERSITY

Confidentiality & Consent



Understanding Stakeholder Perceptions of the College-Hillcrest Trail

Overview:
This survey is one of seven methods being used to collect data about the needs of the College-Hillcrest Trail for a Master's Project and Report in Landscape Architecture at Kansas State University. The survey was developed for academic use only and raw data from the survey will remain confidential; data will not be distributed among stakeholders, but the findings of the survey will be made accessible through KREx in June.

Investigators:
Prof. Lorn Clement, Associate Professor, Landscape Architecture and Regional & Community Planning, Kansas State University,

Neal Heidt, MLA Student, Landscape Architecture and Regional & Community Planning, Kansas State University,

Purpose:
The purpose of this research study is to better understand how the College-Hillcrest Trail is perceived by its stakeholders. Your input in this survey may be used to help make future improvements to the trail.

Study Procedure:

No prior knowledge or expertise is required to participate in this study. The survey includes two short sections of questions pertaining to demographics and the designed environment. This survey should take less than 6 minutes to complete.

Confidentiality:
The information that you provide for this research will be anonymous. Although agency information will be collected in the survey, no personally-identifiable information will be collected.

Contact Information:
If you have any questions or concerns about this study, you may contact Lorn Clement or Neal Heidt (details above). If you have any concerns or complaints about your rights as a research participant and/or your experiences while participating in this study, you may contact the Kansas State University Research Compliance Office:

203 Fairchild Hall
Manhattan KS, 66502
785-532-3224
comply@k-state.edu

Consent (required):
Your participation in this study is entirely voluntary and you may refuse to participate or withdraw from the study at any time. By clicking next, you acknowledge that you have read and understand the terms above. By continuing with this study you **(1)** verify your consent to participate in this study, and **(2)** are participating in this survey as a "stakeholder," as defined below (not as a trail user).

stakeholder (n.)
A person or group of people with an interest or concern in a particular matter (Oxford 2017). In this study, the term "stakeholders" refers to any party which owns or operates land on or adjacent to the trail. This includes both individuals and groups in the public and private sector.

If you belong to more than one of the "Stakeholder Groups" on the following page, please take this survey once for each stakeholder group you belong to.

Figure 7.24 Qualtrics stakeholder survey, seen here in iPad format

Affiliation & Role

Please describe your role:

Stakeholder group

Stakeholder subgroup

Your role within the subgroup

If you marked "other" in the first text box above, please describe...

In your opinion, is this trail more of a liability or an asset?

It is a significant liability — It is a significant asset

Stakeholder Perceptions of User Needs and User Circulation Patterns

The prompts on the next page are intended to gauge your opinion on potential modifications of the trail. The prompts are based on needs and trends expressed by the trail's users in a prior survey.

Please take as much time as you need to answer these questions. There are no correct or incorrect responses.

In your opinion, implementing the following security features along the trail would make this trail...

...more of a liability — ...more of an asset

Security beacon/call box

Security cameras

In your opinion, modifying the trail environment to more closely match the following vegetation scenarios would make this trail...

...more of a liability — ...more of an asset

Figure 7.24 Qualtrics stakeholder survey, seen here in iPad format

In your opinion, modifying the trail environment to include the following lighting types would make this trail...

	...more of a liability				...more of an asset
	○	○	○	○	○
	○	○	○	○	○
	○	○	○	○	○
	○	○	○	○	○

How would increased use of the trail, in the following ways, affect your opinion of the trail?

	More of a liability				More of an asset
...by those accessing stadiums/athletics...	○	○	○	○	○
...by those in their early twenties...	○	○	○	○	○
...by runners...	○	○	○	○	○
...before dawn...	○	○	○	○	○
...for recreation/leisure...	○	○	○	○	○
...after dusk...	○	○	○	○	○
...by bicyclists...	○	○	○	○	○
...by larger concentrations of users at one time...	○	○	○	○	○
...for stationary activities (e.g. bicycle parking, food trucks, etc.)...	○	○	○	○	○

Comments

If you have any questions, comments, or concerns about this trail, please state them here. Include in your response any modifications which you believe would have a significant positive or negative effect on the trail as a whole and/or to you as a potential user.

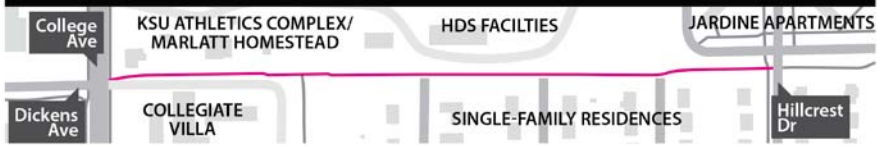
Powered by Qualtrics

Figure 7.24 Qualtrics stakeholder survey, seen here in iPad format

APDESIGN LARCP

Sponsored by the Department of Landscape Architecture and Regional & Community Planning

COLLEGE-HILLCREST TRAIL STAKEHOLDER SURVEY



You're located right next to this trail. Why not take a 5-minute survey to tell researchers what you think?

*Go to **https://goo.gl/rpue8v** to take the survey.*
This link expires at 11:59pm on Monday, March 6, 2017.

SURVEY OVERVIEW
This survey is one of seven methods being used to collect data about the needs of the College-Hillcrest Trail for a Master's Project and Report in Landscape Architecture at Kansas State University. The survey was developed for academic use only and raw data from the survey will remain confidential; data will not be distributed among stakeholders, but the findings of the survey will be made accessible through KREx in June.

SURVEY TOPICS
Opinions of existing trail
Possible security measures to be implemented along trail
Possible vegetation improvements along trail
Possible lighting improvements along trail
Possible methods for increasing trail usage

QUESTIONS OR COMMENTS
Prof. Lorn Clement, Associate Professor, [redacted]
Neal Heidt, MLA Student, [redacted]

College-Hillcrest Trail Stakeholder Survey

Neal Heidt

Mon 4/3/2017 12:41 AM

1 attachments (90 KB)
8519_Fact Sheet.pdf;

Dear _____,

My name is Neal Heidt, and I am a graduate student in Landscape Architecture. For my Master's Project and Report, I am studying public perceptions of the trail that runs between College Avenue and Hillcrest Drive.

I am contacting you because you either own or operate property located right next to this trail. Could you spare 5 minutes to take a survey to tell me what you think of the trail? This would help my research greatly.

Click here to take the survey.

Attached is a flier which provides more details about the survey and its purpose within the research. If you have any questions, comments, or concerns, please contact Lorn (copied) or myself.

Thank you for your time.

Neal Heidt
Graduate Student | Master of Landscape Architecture
College of Architecture, Planning, and Design | Kansas State University
[redacted]

Figure 7.25 Flier and email template used for stakeholder survey recruitment

Dear neighbor,

My name is Neal Heidt, and I am a graduate student in Landscape Architecture. For my Master's Project and Report, I am studying public perceptions of the trail that runs between College Avenue and Hillcrest Drive.

I am contacting you because you either own or lease property located right next to this trail. Could you spare 5 minutes to take a survey to tell me what you think of the trail? This would help my research greatly.

Please visit https://goo.gl/rpue8v to take the survey.

Attached are several fliers which provide more details about the survey and its purpose within the research. If you have any questions, comments, or concerns, please contact my major professor (Lorn Clement, contact information given below) or me.

Thank you for your time and participation!

Neal Heidt
Graduate Student | Master of Landscape Architecture
College of Architecture, Planning, and Design | Kansas State University
[redacted]

Laurence A. Clement, Jr., JD, RLA
Associate Professor | Landscape Architecture and Regional & Community Planning
College of Architecture, Planning, and Design | Kansas State University
[redacted]

PROJECT TITLE: Understanding Usage Patterns and Perceptions of the College-Hillcrest Trail

APPROVAL DATE OF PROJECT: 10/28/2016

IRB APPROVAL NUMBER: #8519

PRINCIPAL INVESTIGATOR:
Laurence A. Clement, Jr., JD
Associate Professor
Department of Landscape Architecture and Regional & Community Planning

CO-INVESTIGATOR(S):
Neal Heidt
Graduate Student
Department of Landscape Architecture and Regional & Community Planning

Brent Chamberlain, PhD
Assistant Professor
Department of Landscape Architecture and Regional & Community Planning

Katie Heinrich, PhD
Associate Professor
Department of Kinesiology

CONTACT NAME, EMAIL, AND PHONE FOR ANY PROBLEMS/QUESTIONS:
Prof. Laurence Clement, [redacted]
Neal Heidt, [redacted]

IRB CHAIR CONTACT/PHONE INFORMATION:

- Rick Scheidt, Chair, Committee on Research Involving Human Subjects, 203 Fairchild Hall, Kansas State University, Manhattan, KS 66506, [redacted]
- Cheryl Doerr, Associate Vice President for Research Compliance, 203 Fairchild Hall, Kansas State University, Manhattan, KS 66506, [redacted]

SPONSOR OF PROJECT: Kansas State University Department of Landscape Architecture and Regional & Community Planning

PURPOSE OF THE RESEARCH: The City of Manhattan ("the City") plans to place lights along the trail that runs between College Avenue and Hillcrest Drive. To aid the City in design, the K-State would like to understand how stakeholders perceive the trail. Findings from the study will be presented to the City.

PROCEDURES OR METHODS TO BE USED: Data about the site will be collected, analyzed, and then mapped. Surveys of trail users and neighborhood residents will be conducted. The results of the two surveys will be compared to the maps previously made. These maps will be used to understand the connection between landscape traits and human experiences.

LENGTH OF STUDY: The survey takes an estimated 4-6 minutes to complete.

RISKS OR DISCOMFORTS ANTICIPATED: There are no risks involved in survey participation.

BENEFITS ANTICIPATED: Survey trends may be used by the City of Manhattan when improving the trail.

EXTENT OF CONFIDENTIALITY: Names or other personal identifiers will not be asked in the survey.

PARENTAL APPROVAL FOR MINORS: No person under 18 years of age will be permitted to take part in this study.

Figure 7.26 Informative letter and fact sheet regarding stakeholder survey, distributed to neighboring residents

I. NON-TECHNICAL SYNOPSIS
A second survey will be conducted to understand stakeholder perceptions of the same trail. Owners, operators, and tenants of on-site and immediately-adjacent properties will be asked to take a 4-6 minute survey. This survey will be distributed in electronic format only

II. BACKGROUND
The second (stakeholder) survey will be developed based on the findings from the first (user) survey.

III. PROJECT/STUDY DESCRIPTION
Stakeholders will be contacted in advance of the second survey to establish the best method of contact (see Modification V.C.). The survey will be distributed to them via this method.

IV. OBJECTIVE
(no change)

V. DESIGN AND PROCEDURES
A. (no change)
B. Demographics (stakeholder affiliation and role); Stakeholder perceptions (presence of security measures, vegetation types, lighting styles, variety of increased trail usage types)
C. The survey will be conducted using a Qualtrics survey on a tablet (survey attached to e-mail). The second survey will be proctored via web link (distributed through email, postal mail, and/or door fliers) and/or in person on an iPad, depending on the pre-established best method of contact with individual stakeholders.
D. (no change)
E. (no change)
F. (no change)

VI. RESEARCH SUBJECTS
A. Stakeholders of the Trail
B. $n \geq 1$ for each of the 24 stakeholder subgroups
C. All parties who own, operate, or lease property on or immediately adjacent to the trail.
D. Any party which declines to response after being contacted through multiple forms of communication or any party which declines to complete the survey
E. Subjects will be identified through Riley County's GIS parcel ownership map and through phone calls and emails to the City and University. Through this initial contact, knowledge of the survey will be distributed through word of mouth. Each subject who agrees to the consent statement on the first page of the survey is enrolled. The final report from this study may or may not be distributed to subjects upon researchers' completion of the report.

VII. RISK - PROTECTION – BENEFITS
All data is anonymous with no personally identifiable information collected (stakeholder affiliation and role).
(no changes otherwise)

VIII. CONFIDENTIALITY
(no change)

IX. INFORMED CONSENT
Contact information for both the PI and the URCO/IRB office will be included.
(no changes otherwise)

X. PROJECT INFORMATION
(no change)

XI. SUBJECT INFORMATION
(no change)

XII. FDA ACTIVITIES
(no change)

XIII. CONFLICT OF INTEREST
(no change)

XIV. PROJECT COLLABORATORS
(no change)

XV. IRB TRAINING
(no change)

XVI. ASSURANCES
(signature at bottom of application)

Figure 7.27 IRB modification for stakeholder survey

KANSAS STATE UNIVERSITY | University Research Compliance Office

TO: Dr. Laurence Clement
Landscape Architecture
Seaton Hall

FROM: Rick Scheidt, Chair
Committee on Research Involving Human Subjects

DATE: 02/15/2017

RE: Proposal #8519.1, entitled "Understanding Usage Patterns and Perceptions of the College-Hillcrest Trail."

A MINOR MODIFICATION OF PREVIOUSLY APPROVED PROPOSAL #8519, ENTITLED, "Understanding Usage Patterns and Perceptions of the College-Hillcrest Trail"

The Committee on Research Involving Human Subjects at Kansas State University has approved the proposal identified above as a minor modification of a previously approved proposal, and has determined that it is exempt from further review. This exemption applies only to the most recent proposal currently on file with the IRB. Any additional changes affecting human subjects must be approved by the IRB prior to implementation and may disqualify the proposal from exemption.

Unanticipated adverse events or problems involving risk to subjects or to others must be reported immediately to the IRB Chair, and / or the URCO.

It is important that your human subjects project is consistent with submissions to funding/contract entities. It is your responsibility to initiate notification procedures to any funding/contract entity of changes in your project that affects the use of human subjects.

203 Fairchild Hall, Lower Mezzanine, 1601 Vattier St., Manhattan, KS 66506-1103 | 785-532-3224 | fax: 785-532-3278 | comply@ksu.edu | k-state.edu/research/comply

Figure 7.28 Stakeholder survey IRB approval letter

TRAIL LIABILITY VS. ASSET RATING

IN YOUR OPINION, IS THIS TRAIL MORE OF A LIABILITY OR AN ASSET? (BLIND LIKERT; WITH CONFIDENCE INTERVALS AT 95% CONFIDENCE LEVEL SHOWN)

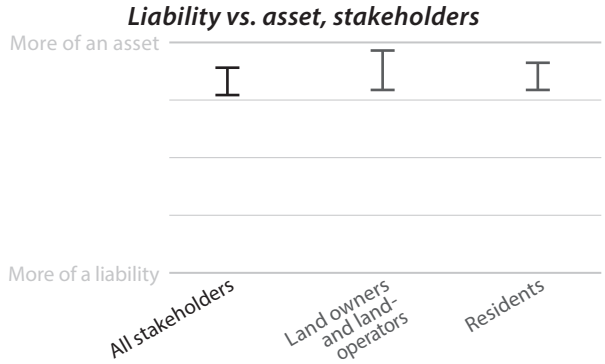


Figure 7.29 Stakeholder survey results (Qualtrics 2017)

SECURITY FEATURES, VEGETATION TYPES, AND LIGHTING TYPES

PLEASE RATE HOW THE FOLLOWING ITEMS WOULD AFFECT THE TRAIL'S STATUS TO YOU (LIKERT; WITH CONFIDENCE INTERVALS AT 95% CONFIDENCE LEVEL SHOWN):

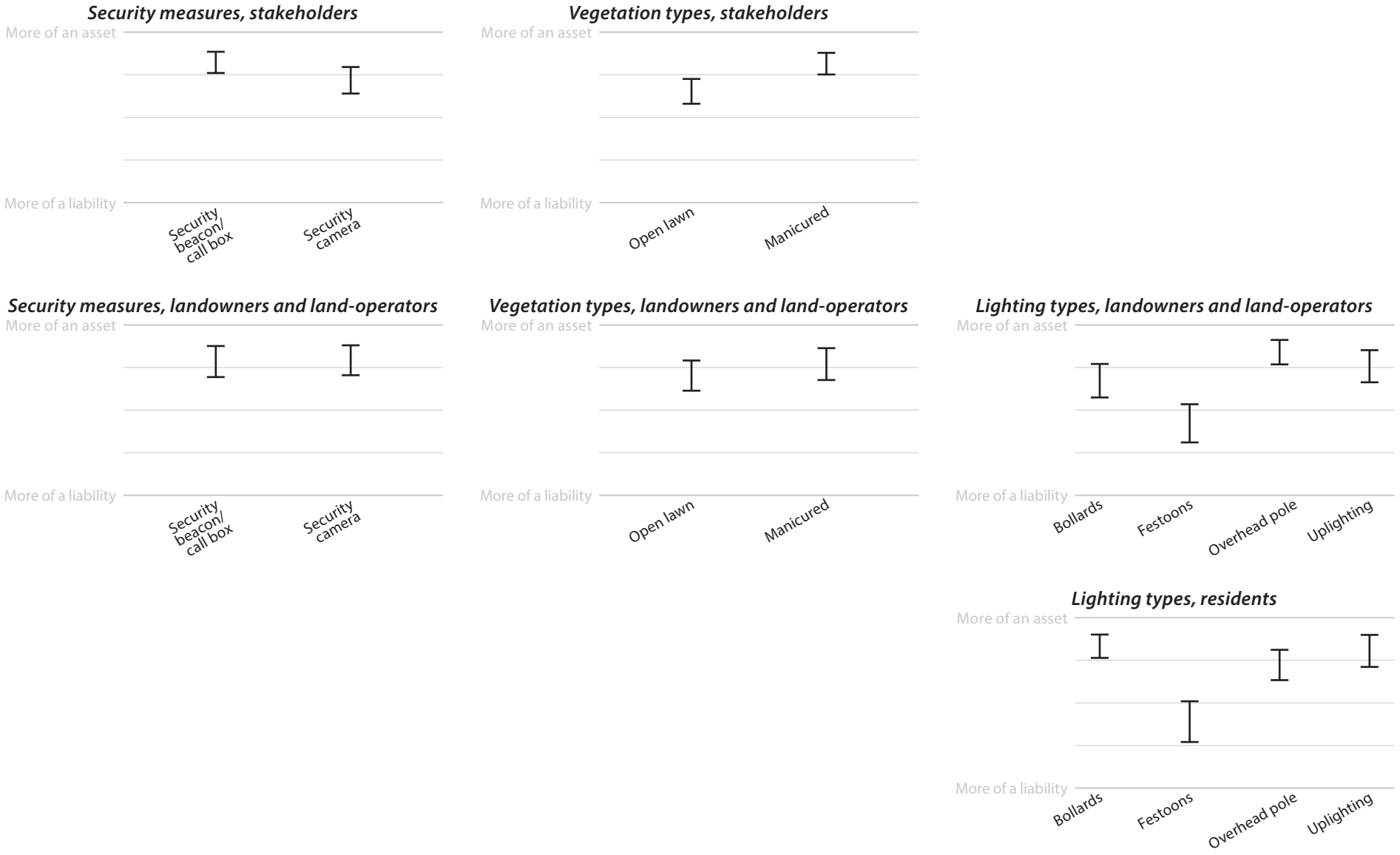


Figure 7.29 Stakeholder survey results

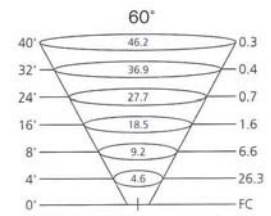
APPENDIX K: LIGHTING NOTES

Note: All figures in this appendix not to scale.

The following measurements and specifications were used for design reference when developing the design alternatives. 60° bulbs were used for all calculations, as these bulbs provide the widest commonly-manufactured angle of output light; this responds to the Trail by minimizing the distance needed to project light in its narrow tunnel-like environment. All figures not to scale.

5W3K60	MR16 LED	
	WATTAGE	5w
	BEAM SPREAD	60°
	COLOR TEMP.	3000K
	LUMENS	320
	CANDLE POWER	420
	BASE	Bi-Pin
	LIFESPAN	50,000 Hrs.

PHOTOMETRICS



5W27K60	MR16 LED	
	WATTAGE	5w
	BEAM SPREAD	60°
	COLOR TEMP.	2700K
	LUMENS	300
	CANDLE POWER	410
	BASE	Bi-Pin
	LIFESPAN	50,000 Hrs.

PHOTOMETRICS

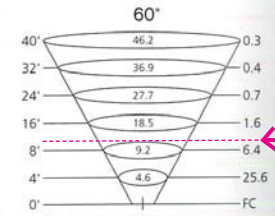


Figure 7.30a Photometrics for LED bulbs (adapted from Hinkley Lighting, Inc. 2016, 80-81)

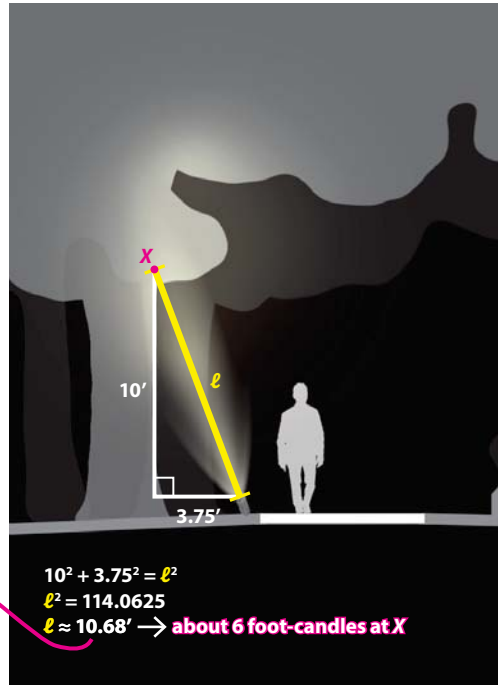
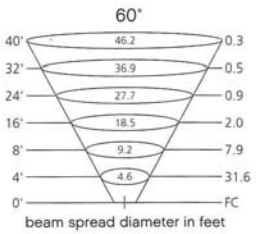
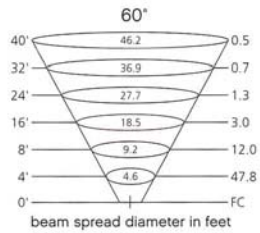
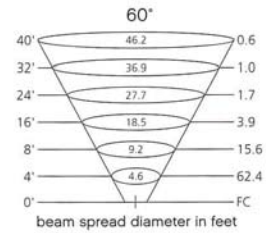


Figure 7.30b Example of a Pythagorean theorem calculation used to understand photometrics

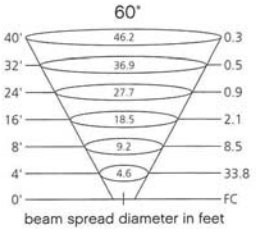
60° FLOOD LIGHT 2700K	3W | 1536XX-3W27FL		5W | 1536XX-5W27FL		7.5W | 1536XX-8W27FL	
	LUMENS	CANDLE POWER	LUMENS	CANDLE POWER	LUMENS	CANDLE POWER
	237	506	360	765	470	998

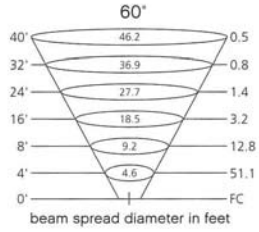






60° FLOOD LIGHT 3000K	3W | 1536XX-3WLEDFL		5W | 1536XX-5WLEDFL		7.5W | 1536XX-8WLEDFL	
	LUMENS	CANDLE POWER	LUMENS	CANDLE POWER	LUMENS	CANDLE POWER
	255	541	385	817	502	1066





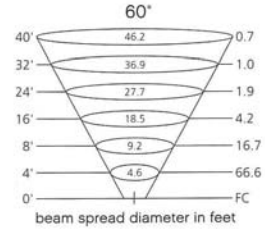


Figure 7.31 Photometrics for spotlighting bulbs (from Hinkley Lighting, Inc. 2016, 79)